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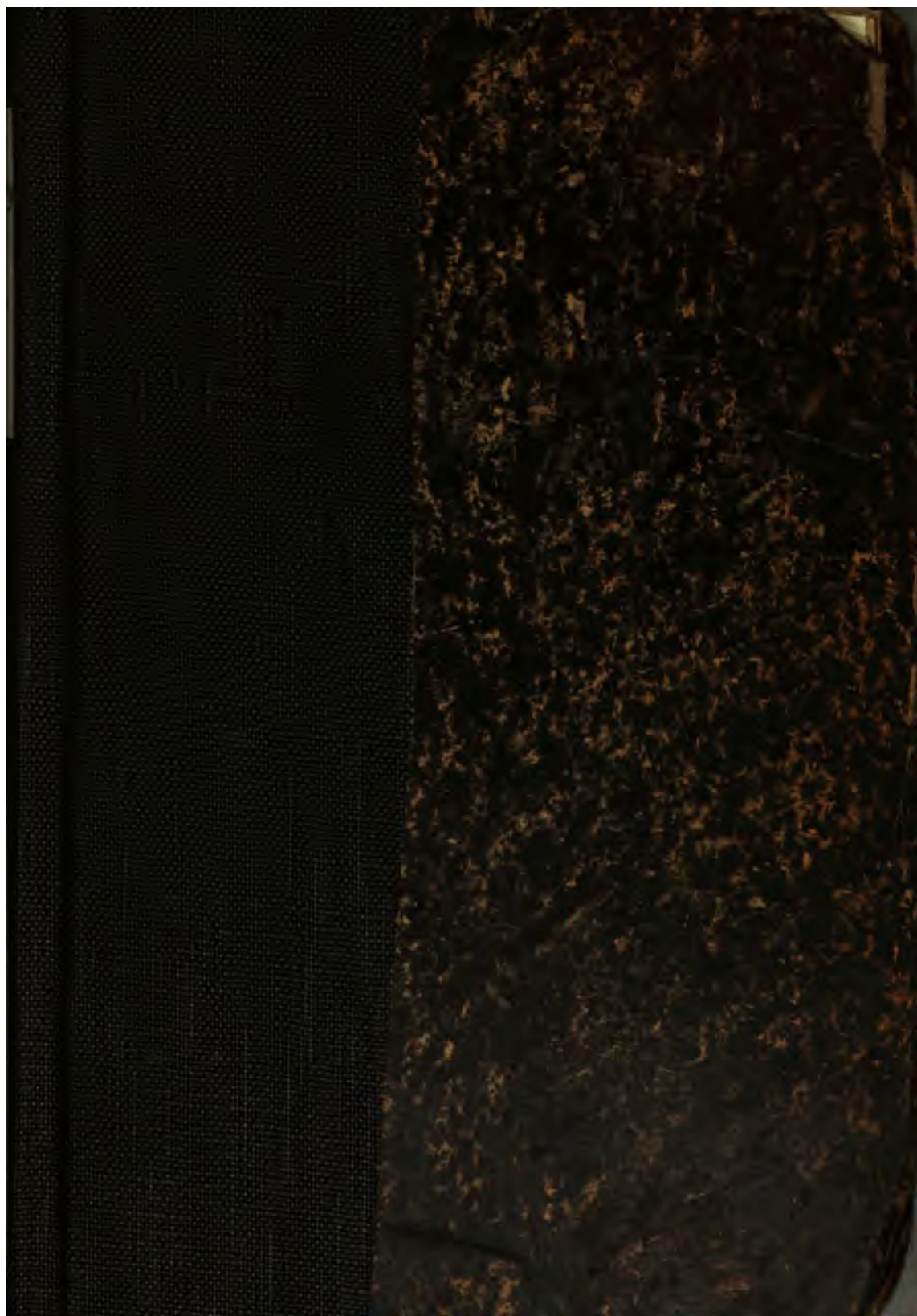
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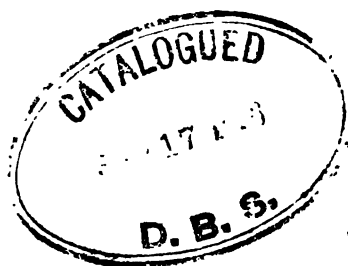
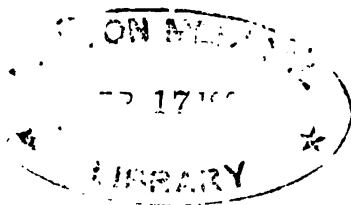
THE  
ANNALS OF CHYMISTRY  
AND  
PRACTICAL PHARMACY.

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VOL. I.

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THE  
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No. 1.] SATURDAY, OCTOBER 1, 1842. [Vol. I.

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TO THE PROMOTERS OF SCIENCE.

It must have occurred to every practical man who may have consulted the recently published works on Pharmacy, by Drs. PEREIRA, CHRISTISON, A. T. THOMSON, and BRANDE, how interesting it would be to peruse in detail the Journals, Works, and Papers, which are so continually referred to by the above truly indefatigable writers; and when the indomitable investigator has, at considerable cost, and after no few disappointments, become the possessor of such works, containing information on the subject in which he is interested, in the detailed narrative of the original writers, how constantly does he arrive at the mortifying conclusion, that from the time which has elapsed since their publication, owing to the rapid progress made by Chymistry, and her sister, Pharmacy, very much clearer views than those he is in possession of must have been developed by some individual equally persevering, but perhaps more fortunately guided than himself. For him unfortunately, although far different for the philosopher, is it, that the hypotheses of to-day, after undergoing a purifying ordeal, become the theories of to-morrow, while the theories of yesterday vanish before facts which are unshrouded by the modern discoveries of to-day.

Ponderous tomes are regarded by the present generation as histories of times past, while the present is perused in the constantly recurring journals of the periodical press. It cannot be denied, however, that by the devotion of whole years to an individual pursuit, greater perfection is finally attained: this



does not, however, apply to works on ever changing Chymistry, with her thousand pioneers enthusiastically pushing forward in their several remote paths; neither is there any one so bold as to deny that an immense impetus is afforded, and the fruits of much laborious research may be anticipated, by the constant interchange of the labours of chymists of all countries.

Dismissing altogether, however, as befits children of science, the pecuniary benefit arising from the application of those laws which the labours of others may have developed, is there not experienced in the intellectual mind a warm, albeit an ideal, friendship towards those whose daily progress in congenial pursuits is chronicled in our journals? What chymist is there, loving his craft, and who has followed the young and talented LIEBIG through his sagacious attempts to explain the deeply hidden secrets of vegetable and animal life, or the master mind of BERZELIUS through his comprehensive and luminous theories of inorganic chymistry, lighting up and distinctly arranging paths where all was darkness and confusion, or the eloquent and energetic DUMAS, ever foremost in the van of scientific progress—what chymist is there who does not feel interested in aught that has reference to those circles round which the before-mentioned benefactors of mankind throw a halo; and who that can distinguish an acid from an alkali would not cheerfully render to them that homage we have been wont to pay a DAVY, a WOLLASTON, and a FARADAY?

Great Britain has many able rising men, deeply enamoured of these pursuits, in themselves so full of interest—an interest which might be heightened by the assurance that each individual's results are reciprocally and anxiously perused by the talented men to whom we have alluded, and whose example may have been a comparatively young author's chief encouragement. To these we appeal for aid by their contributions, practically heralding this truth, that the warmest sympathy exists among the cultivators of science in every clime: and our task be it to furnish the sheet where such congenial minds may hold converse with each other.

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## CHEMISTRY, OPERATIVE AND EXPERIMENTAL.

ART I.—*Proximate Analysis of Tobacco, and Composition of Nicotine.* By V. ORTIGOSA.

[WE are led to infer, in consequence of the laws recently enacted relative to tobacco—which laws, it was asserted, have been required to check adulterations seriously affecting the revenue—that the following information will be read with interest.—ED.]

Tobacco dust, which may be obtained in large quantities of tobacco manufacturers, is allowed to digest 24 hours in cold water, acidulated with sulphuric or hydrochloric acid. The expressed liquor must be evaporated to a syrupy consistence, and the very pungent-tasting dark brown residue distilled with about one-sixth of its volume of a strong solution of pure potassa, occasionally adding to the contents of the retort a little water, so as to assist the distillation, which, from the concentration of the liquid, becomes impeded.

The distilled product is a solution of nicotine and ammonia, and the former will be observed floating on the surface of the liquid, when concentrated, in the form of a clear brown oil.

The liquid must be neutralized with sulphuric, or, better still, oxalic acid, since the former appears to decompose nicotine, and then it must be gradually evaporated to dryness.

The brown crystallized saline mass is then heated in pure anhydrous alcohol to the boiling point, which dissolves the oxalate of nicotine, and leaves the oxalate of ammonia on the filter.

The alcoholic solution of oxalate of nicotine is to be evaporated to the consistence of a syrup, and then decomposed with caustic potassa in a closed vessel, and the mass agitated with ether; by a repetition of which treatment the whole of the nicotine is taken up.

The ethereal solution must now be distilled in a water bath, when, firstly, pure ether, then ether and water, with traces of nicotine, and lastly a colourless transparent oil, passes over, which assumes a yellowish tint at the termination of the process.

*Composition.*—M. Ortigosa continues—Posselt and Reimann considered this product as pure nicotine; but, according to my analyses, it seemed to contain water and alcohol. The oil taken during the process of distillation contained more or less carbon, according to the more or less advanced stage of the process at

which it was examined. Thus two analyses gave me in 100 parts:—

		1.	2.
Carbon	- - - -	66.60	68.05
Hydrogen	- - - -	9.37	9.45

I next endeavoured to remove the water from the nicotine by means of fused caustic potassa; this united with the water, but at the same time it dissolved partly in the nicotine, and on submitting the same to distillation, a liquid was obtained which differed in its properties from nicotine. It no longer possessed the characteristic smell of this latter, and yielded on analysis only 52 per cent. of carbon instead of 73, which is contained in anhydrous nicotine, and the addition of chloride of platina did not occasion a precipitate. By slow evaporation, crystals were formed, easily soluble in alcohol,—a property which the double salt of chloride platina and nicotine does not possess. Nicotine is a colourless transparent oily liquid, possessing a strong disagreeable odour of tobacco. Heated to a temperature below 212°, it evolves white fumes of an insupportable odour. At 212° it distils over freely; but in the anhydrous state it might probably require a higher temperature. It leaves in distillation a resinous residue, soluble in alcohol, which is easily precipitable by the addition of water.

Heated on platina foil over a spirit lamp, nicotine develops inflammable fumes, leaving a carbonaceous residue, which, however, completely disappears at a red heat.

Combined with one-half, or even less, of water, nicotine forms a clear solution; more water, however, renders it turbid, which may be instantly obviated by the addition of a few drops of alcohol. Nicotine is soluble, in every proportion, in alcohol, and also in ether; the latter will remove it from water. Solutions of nicotine strike a brown colour with turmeric paper.

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#### ART. II.—*Cubebine*.

M. Monheim has described, under the above term, a volatile substance. M. Cassola, under the same name, has described a soft and resinous, and Messrs. Soubeiran and Capitaine a crystallized, substance. M. Steer has confirmed the result of these latter writers by renewed experiments, the result of which we proceed to relate. After having submitted the cubeb pepper to distillation, in order to remove the essential oil, it is dried, and an alcoholic \* extract is made, which is distilled until there remains only one-fourth of the primitive volume, and which is

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\* We understand by this term a concentrated tincture.



then filtered, previous to submitting to renewed distillation. When this has been done, a residue containing some resin is obtained, and which assumes the condition of a mass approaching to the crystalline form, when allowed to remain in a cold place. This crystalline mass is placed on linen, which allows the resinous liquid to percolate (the cubebine of M. Cassola): after twenty-four hours, this is almost completely removed, and the mass which remains is dissolved in three or four times its weight of boiling alcohol, sp. gr. 0.90. The solution is allowed to clarify, maintaining the boiling temperature, the liquor is decanted from the undissolved resin, and the cubebine crystallizes on cooling. In order to purify it, it is dissolved in concentrated boiling alcohol; animal charcoal, and a little boiling water, are afterwards added: the boiling liquid is filtered, and then allowed to cool, by which the cubebine is precipitated in needles of some lines in length, uncoloured, and of a pearly lustre. It crystallizes from concentrated alcohol in grains. Under this form it possesses but a weak odour of cubebs, and is insipid, although the spirituous solution has a bitter taste. It is insoluble in water, almost insoluble in cold alcohol, but very much so in boiling alcohol, even when it contains some water. It separates from the solution on cooling under the form of flakes, and these are readily soluble in cold alcohol\*.

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ART. III.—*Dilute Nitric Acid as a test to distinguish whether Ground Rice or West Indian Arrow Root has been adulterated with Potato Starch.* By Dr. SCHARLING, of Copenhagen.

IT is known that *rice flour*, as an object of trade, as well as West Indian arrow root, are sometimes mixed with potato starch. Having been requested to examine samples of rice flour and arrow root, I employed several tests which had been formerly used for the same purpose. By means of a good microscope, any one may, by practice, discover very small quantities of potato starch in rice flour, provided that both powders have been ground separately, and afterwards mixed. If, on the other hand, they have been ground together, that peculiar glittering, which distinguishes the particles of potato starch, is not perceptible, and microscopic observations are in such cases inapplicable. I obtained more favourable results by employing dilute nitric acid. If rice flour or potato starch be mixed and stirred with concentrated nitric acid in the proportion of about one part of flour to  $1\frac{1}{2}$  or 2 parts of acid, either of these mixtures will form almost

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\* We have prepared the above, and believe, from our experiments, it possesses valuable controlling powers in the early stage of some complaints.—ED.

instantaneously a tough glutinous mass. This mass is, in reference to potato starch, almost transparent, but in the case of rice flour, opaque. Both substances yield a mixture of formic acid. A mixture of nitric acid and water operates very differently on the different kinds of fecula. The glutinous mass yielded by potato starch becomes in a very brief period so tough that the pestle employed for stirring the mixture is sufficiently agglutinated to the mortar, that the latter may be lifted from the table by means thereof. Rice flour, on the other hand, requires from 25 to 30 minutes to assume a similar tenacity. The different degrees of fineness of the flour may perhaps have some influence on the greater or less space of time with which rice flour is transformed into this glutinous mass. The above-mentioned remark refers, however, more particularly to rice flour, which, by means of sifting, I had brought to a degree of fineness similar to that of potato starch, which is usually superior to that of rice flour, as generally sold. Being satisfied with these results, I undertook a series of experiments on different mixtures of rice flour and potato starch, which led me to the following conclusions:— That even if rice flour contains not more than from 4 to 6 per cent. of potato starch, this may be detected, by means of dilute nitric acid, in the following manner:—

Take two samples of equal weight; for instance, one dram of pure rice flour and one dram of potato flour: put either of these into a small porcelain mortar, and add, continually stirring, double the quantity (two drams) of a mixture of equal parts of commercial nitric acid and water. The stirring is to be continued only so as to thoroughly mix the flour with the acid, two or three minutes after which, the quantity of pure potato flour will have been changed into a jelly, so that in taking out the pestle the mass remains adherent to the sides of the mortar. To effect a similar change in the rice flour, will require from 20 to 25 minutes, sometimes considerably more, depending on the fineness of the flour, but never during the first 15 minutes, if the acid employed for the purpose be not too strong. On the other hand, if the rice flour contains from 20 to 25 per cent. of potato starch, the mixture is usually converted in 40 or 50 seconds to the state of a solid jelly, supposing the acid to have a strength of  $13\frac{1}{2}^{\circ}$  B. = Sp. gr. 1.104.

As, however, in all experiments suggested for the unpractised, it is important that they should be as easy as possible, or at least sufficiently certain, I instituted several experiments with different mixtures of nitric acid and water, in order to ascertain if it be requisite to employ acid of a certain strength. Instead of ascertaining the strength of these mixtures by means of their specific gravity, and in ordinary life persons are seldom disposed to adopt this mode of proceeding, I directed my attention to the

space of time required for the purpose of changing pure potato starch into a perfectly coherent jelly. If the acidulous mixture be strong enough to immediately change the starch into a clear jelly as soon as the acid is in contact with the flour, it must be diluted with water; if, on the other hand, the mixture requires more than two minutes in order to form a jelly with the starch, it is weaker than the obtaining a speedy result indicates.

I found the above-mentioned mixture of equal parts of the yellow fuming nitric acid usually sold, with water (giving a solution of  $13\frac{1}{2}^{\circ}$  B. = Sp. gr. 1.104.) very convenient.

That it is impossible to ascertain, at the same time, *how much* of the potato starch has been added, might appear at a first glance a considerable defect in this experiment. This, however, is less frequently required; and in such cases it will not be difficult to ascertain very nearly the exact proportion, by taking several quantities of pure rice flour and mixing them with different quantities of starch. If, then, the time elapsing until one or the other sample of admixed rice flour forms the above-mentioned jelly, be carefully observed, it will afterwards easily appear which of these indicating mixtures approaches the nearest to that under investigation. In a series of these experiments it is immaterial if the acid be somewhat weaker than the above-mentioned strength, as it will then be easier to observe the time with precision.

The West Indian arrowroot, as it is called, is acted upon by nitric acid in the same way as rice flour, whilst, on the other hand, the starch of wheat flour resembles in this particular the starch of potatoes. It is well known that Marezeau formerly proposed the employment of nitric acid for the purpose of ascertaining the presence of potato starch in flour, by the strong smell of formic acid which the potato starch evolves when in contact with nitric acid; but as this is equally the case with rice flour and arrow root, the action of nitric acid cannot be of any use in this way.—*Liebig's Annalen*.

[We could hazard a remark on the above communication, did we not fear it might be misapplied by the adulterator.—ED.]

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ART. IV.—*On the Perchlorate of the Oxide of Ethyle, or Perchloric Ether.* By CLARK HARE and MARTIN H. BOYE.

THE energetic properties of perchloric acid, and its stability, compared with the other compounds of chlorine with oxygen, led us to the belief that this acid might be combined with the substance which performs the part of a base in that class of organic salts which are generally designated by the name of



*ethers*, and for which Berzelius, in consequence of his theoretical views, has adopted the name of oxide of ethule. For this purpose a concentrated solution of perchlorate and sulphovinate of barytes, in equivalent proportions, was subjected to distillation. The sulphovinate of barytes may be considered as a double sulphate of barytes and the oxide of ethule; and we anticipated that, when heat was applied, a double decomposition would take place between the latter and the perchlorate of barytes. So long as the salts remained in solution, no reaction occurred; but as soon as they became solid in consequence of the distillation of the water, a reciprocal decomposition ensued, and a sweet ethereal liquid distilled into the receiver. This liquid is the *perchlorate of the oxide of ethule*.

As this substance is extremely explosive, it is necessary, in order to prepare it with safety, to operate on small quantities. We have employed from seventy to ninety grains of crystallized sulphovinate of barytes, with an equivalent proportion of perchlorate of barytes\*; but we would recommend, especially on the first performance of the experiment, the employment of considerably smaller quantities. The salts should be intimately mixed in a mortar, and placed in a small retort attached to a refrigerator containing ice, and a receiver similarly cooled. The retort is to be heated in an oil-bath, in which a thermometer is suspended, so as to indicate the temperature. A wooden screen, furnished with openings covered with thick plate-glass at such intervals as to afford a full view of the different parts of the apparatus, should be erected in front of it, and strings passed around the screen and attached to a bar traversing on a pivot, and supporting an argand spirit-lamp, by which heat is communicated to the oil-bath, so as to enable the flame of the lamp to be removed from or applied to the apparatus, according to the indications of the thermometer, without exposing the person of the operator. After the heat has reached 212° F., below which the salts employed do not react on each other, it should be raised very gradually, and the distillation finished below 340° F. Under these circumstances but little danger is to be apprehended from the retort, but the ether in the receiver must be treated with the greatest caution, since it has exploded in our hands in attempting to remove it with a pipette from the stratum of water which covers it. This water, therefore, should be removed by the cautious use of strips of blotting paper,

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\* The amount of barytes in the perchlorate should be ascertained by an experiment, as it retains water with great tenacity. It may be worth while to mention, that the perchlorate of potassa cannot be substituted for the perchlorate of barytes, since the sulphovinate is decomposed without acting on it. We were equally unsuccessful in an attempt to procure the ether by the distillation of perchlorate of barytes and concentrated sulphovinic acid.

moistened at the end, and introduced into the tube employed as a receiver.

To avoid the danger attendant on the management of the ether in its pure state, it may be received in strong alcohol, since it is not explosive when dissolved in alcohol. If the experiment be performed with seventy grains of sulphate of barytes, from one to two drachms of absolute alcohol will be found sufficient for this purpose. By the addition of an equal volume of water, the ether may subsequently be separated from this solution, in small quantities, for the purpose of examination. But, in this case, a loss of ether is sustained by the decomposing influence of the water employed.

The perchlorate of ethyle obtained in this way is a transparent, colourless liquid, possessing a peculiar, though agreeable smell, and a very sweet taste, which, on subsiding, leaves a biting impression on the tongue, resembling that of the oil of cinnamon. It is heavier than water, through which it rapidly sinks. It explodes by ignition, friction, or percussion, and sometimes without any assignable cause. Its explosive properties may be shown, with but little danger, by pouring a small portion of the alcoholic solution into a porcelain capsule, and adding an equal volume of water. The ether will collect in a drop at the bottom, and may be subsequently separated by pouring off the greater part of the water, and throwing the rest on a moistened filter, supported by a wire. After the water has drained off, the drop of ether remaining at the bottom of the filter may be exploded, either by approaching it to an ignited body, or by the blow of a hammer. We are induced to believe that, in explosive violence, it is not surpassed by any substance known in chemistry. By the explosion of the smallest drop, an open porcelain plate will be broken into fragments, and by that of a larger quantity, be reduced to powder. In consequence of the force with which it projects the minute fragments of any containing vessel in which it explodes, it is necessary that the operator should wear gloves, and a close mask, furnished with thick glass-plates at the apertures for the eyes, and perform his manipulations with the intervention of a moveable wooden screen.\*

In common with other ethers, the perchlorate of ethyle is insoluble in water, but soluble in alcohol; and its solution in the latter, when sufficiently dilute, burns entirely away without explosion. It may be kept for a length of time unchanged, even when in contact with water; but the addition of this fluid,

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\* Having suffered severely on several occasions from the unexpected explosion of this substance, we would earnestly recommend the operator not to neglect the precautions mentioned above.

when employed to precipitate it from its alcoholic solution, causes it to be partially decomposed. Potassa, dissolved in alcohol, and added to the alcoholic solution, produces, immediately, an abundant precipitate of the perchlorate of that base, and, when added in sufficient quantity, decomposes the ether entirely. It would appear, therefore, impracticable, to form either perchlorovينات or perchlorovinic acid.

We have subjected the perchlorate of ethule to the heat of boiling water without explosion or ebullition.

It may be observed that this is the first ether formed by the combination of an inorganic acid containing more than three atoms of oxygen with the oxide of ethule, and that the chlorine and oxygen in the whole compound are just sufficient to form chlorohydric acid, water and carbonic oxide with the hydrogen and carbon.

The existence of a compound of the oxide of ethule with an acid containing *seven* atoms of oxygen, led us to attempt to combine, by the same method, this base with nitric acid. For this purpose we subjected a mixture of sulphovinate and nitrate of barytes to the same treatment as described above, but the reaction, even when conducted with the greatest possible care, is destructive, hyponitrous ether and gaseous matters being the principal products obtained. Nor were we more successful in our attempts to procure a sulphurous or hyposulphuric ether by the same process.—*American Journal of Science and Arts*.

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#### ART. V.—*Citrate of Iron.*

“ A ferro-citrate of ammonia (called citrate of iron) is met with in the shops.”  
PEREIRA.

THE formulæ which have been given for the preparation of this beautiful salt are far from satisfactory to the experimentalist who wishes to attain a product equal to that which is met with in the shops, and to which Dr. Pereira alludes, in his “Elements of Materia Medica and Therapeutics,” above quoted. A large quantity, prepared according to the formula subjoined, has been supplied to some manufacturing chymists, who, from its comparatively recent introduction, and the doubts they felt as to whether it would maintain its position in the estimation of the medical world, have been unwilling to manufacture it on the large scale. In England, we are indebted to Mr. Bullock, of Conduit Street, for rendering it an article of interest to medical practitioners generally; but the simple title under which physicians had commenced prescribing it, has been objected to, on account of the discovery of ammonia in its composition. The exceedingly deliquescent nature of the salt has given rise to the

preparation of two articles by Mr. Morson, of Southampton-Row, with a view, we believe, of facilitating the transmission of one by post; and these have been distinguished by the names of Citrate and Ammonio-Citrate of Iron. Should the former of these two come into very general use, which we hardly think will be the case, on account of the difficulty experienced in dissolving it, and further, if it be considered advisable that a nomenclature strictly descriptive of the constituents of all new preparations should be attempted, perhaps a change in the name by which it was first made known might be demanded; but in practice, unless the physician or customer is known to have ordered both preparations, we believe dispensers and wholesale druggists receive the terms ammonio-citrate and citrate of iron as synonymous.

Take Citric Acid, in powder, q. p.; clean Iron Filings, or turnings, q. s. Mix, and place them in a shallow wedgewood pan; add sufficient water to cover them, and allow to remain several days, occasionally stirring, and replacing the water as it evaporates.

Hydrogen gas is disengaged, and a white paste, whose surface is tinged with dark green, forms, being Citrate of Protoxide Iron, which passes into the magnetic citrate by the further absorption of oxygen from the atmosphere, and which, if left in contact with iron filings removed from atmospheric influence, yields up its absorbed oxygen and returns to the state of citrate of protoxide of iron, which is *not affected by light*, as erroneously stated by M. Beral. The citrate of protoxide of iron is very insoluble, it being difficult to obtain a neutral solution of sp. gr. 1.004; but either the absorption of oxygen, giving rise to a magnetic citrate, or the addition of half as much citric acid as is contained in the neutral citrate of protoxide, renders the preparation much more soluble, enabling the operator, by the addition of distilled water, to obtain a solution of sp. gr. 1.025. Having thus obtained a solution of the gravity last mentioned, and filtered the same, it remains to saturate it with ammonia, for which there is required one fluidram of the Liq. ammon. fortiss., sp. gr. .882, for every sixteen fluid ounces of the blackish green solution of citrate of iron, sp. gr. 1.025. This precipitates the characteristic greenish black oxide of iron, and favours the absorption of oxygen; for if immediately placed over a water-bath, and evaporated as rapidly as possible, before it has attained the consistence of molasses, a perfect persalt will have been produced. When it has arrived at the consistence of molasses, it must be spread, with a flat Camel hair-brush, on plates, previously made warm in a drying room, to which, when evenly covered, they must be returned. After a short time the salt will be found to have detached itself from the plates, and must then be collected in bottles previously warmed and thoroughly dry.

The above, which, on account of the facility with which it may be conducted, and low cost, is the process of the wholesale chymist; so is it, on account of the intense and brilliant ruby hue of the product, that which the specimen manufacturer would prefer. It has also the advantage of yielding a very uniform product.

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## CHYMISTRY APPLIED TO AGRICULTURE.

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### ART. VI.—*On the Nourishment of Plants.* By TH. DE SAUSSURE.

AMONG the questions which "Le Congrès Scientifique de France" proposed for the solution of Vegetable Physiologists, was the following:—

"Is it possible that organic substances of ternary and quaternary composition can be assimilated, after having been absorbed by the roots of plants?"

By proposing for discussion the assimilation of ternary and quaternary substances only, it may fairly be presumed that a similar process in reference to the elements of water, and decomposition of carbonic acid by plants, had been sufficiently proved.

Among these ternary and quaternary organic substances which are capable of serving for the purposes of nutrition to plants, *humus* and other organic matters, contained in a fertile soil, and which are soluble in water, must be considered as the most important for the theory of manure; and it is to these substances that we propose directing the attention of the reader.

Pure humus is insoluble in water. In mentioning, however, its capability of serving as fit nourishment for plants, I bear in mind its solubility in alkalies.

The component parts of humus are not uniformly the same. Azote may be present or absent. In its natural state, however, as in turf, it generally contains azote. It is commonly supposed that its formation may take place in pure water, but the action of oxygen, or of certain combinations, as the sulphates or other compounds of sulphur, are indispensable to its formation. I kept for several years fir saw-dust in water, from which the air had been removed, under a receiver closed by means of quicksilver. The colour of the wood remained unchanged. Now it is well known how easily its colour changes under ordinary circumstances.

The chief properties of humus are, its black colour, ready solubility in carbonates of the alkalies, the dark colour of these solutions, and precipitation of the humus therefrom by diluted hydrochloric acid, in the form of a brown flaky powder.

Before we enter into a discussion concerning the assimilation of humus by plants, it is necessary to observe that the proposed question includes a supposition which ought to be examined. It is supposed that organic substances, contained in the soil, are absorbed by the roots; but this absorption is not proved, and has indeed been distinctly denied by some writers, especially Mr. Hartig, in his *Organic Chemistry*: with a view to the support of which denial, Dr. Liebig, one of the most distinguished chemists of our time, has published the details.

By experiments undertaken with coloured fluids, in order to define the course which the sap of plants pursues, it was ascertained that sap ascends into the buds and leaves through the fibrous vessels; but the greater part of these experiments were made on plants without roots, and with solutions not always appropriate to the nourishment of the plants subjected to investigation, since this was not the aim of the experiment.

In order to ascertain if the extractive portion of mould or solution of humus could be absorbed by plants for their nourishment, Mr. Hartig instituted the following experiments:—He cultivated some small bean plants in test tubes of 9 millimetres diameter (about one-third of an inch), and of the height of 81 millimetres (nearly  $3\frac{1}{4}$  inches), using for their nourishment a strong coloured solution of humate of potassa. The tubes were filled with  $5\frac{1}{2}$  grammes of this fluid; the plants being 135 millimetres high (nearly  $5\frac{1}{2}$  inches), pushed their roots forward, and absorbed in the space of 24 hours double their own weight of the fluid. The absorbed fluid was every day replaced by distilled water. Notwithstanding such addition, the intensity of colour of the humate of potassa did not appear to diminish after a month. The roots had therefore (continues the author) absorbed the water, rejecting the humus. The analysis of the remaining fluid proved a diminution of weight in the humus of only  $1\frac{1}{2}$  milligrammes (.0231 of a grain.) Mr. Hartig is convinced that this inconsiderable diminution of weight was partly owing to the circumstance that a portion of the humus had gathered around the radicles of the plants, in the shape of flakes.

The same tubes, containing the same plants, were then filled with a filtered decoction of mould. The influence of the vegetating plants did not render the fluid colourless, even after the lapse of three weeks.

In the same manner, by employing the humates of ammonia or soda for a similar experiment, Mr. Hartig was not able to detect either a diminution of weight in the dissolved substances, or a change of colour in the residue after absorption.

These results of experiments on the growth of plants are too much exposed to risk for us to admit them, unless submitted to a strict examination. The description of the experiments un-

dertaken by Mr. Hartig leads us to suppose that the roots of the plants which he employed for these experiments were not sound—1stly. Because they were compressed in a small tube of 9 millimetres (equal to about one-third of an inch) diameter, and of 81 millimetres in height (equal to nearly  $3\frac{1}{4}$  inches), whilst the stalks attained a height of 135 millimetres (equal to nearly  $5\frac{1}{2}$  inches); 2dly. Because they were exposed to the influence of air, after having exhausted the greater part of the fluid contained in the tubes; 3dly. Because the black colour of the ends of their roots proves that they were in a state of decomposition.

I have repeated these experiments, observing a similar process, but avoiding the objections I have cited.

[To be continued.]

ART. VII.—*Essai de Statique Chimique des Etres Organisées.*

Par M. J. DUMAS. 2<sup>ieme</sup> édition, augmentée de Documens numériques. 8vo. pp. 88. Paris: Fortin, Masson et C<sup>ie</sup>. 1842.

BERZELIUS, Dumas, Boussingault, and Liebig, it is well known to the scientific world, have for some years past been engaged in most interesting researches relative to organic chymistry. Whilst the two first of these have had a controversy on the theory of types and substitutions, creditable to both of them for the pure love of science which it has developed, so the last-named author, in his zealous pursuit of knowledge, has also drawn upon himself a discussion with the author of the work we are about to consider; and it is to us another proof of the vast talent and industry of Dumas, that although busily engaged in his laboratory, he can find time to maintain, with a fair degree of success, his position on two distinct and most difficult subjects, and yet produce, for an admiring world, the clear, nervous, and forcibly written work to which we now direct the reader's attention. To commence, in language far less eloquent, because a translation, of Dumas—

“Plants, animals, man, contain matter. Whence comes it? what does it perform in their tissues and the fluids which bathe them? or whither does it depart when death breaks the bonds by which its different parts were so closely united?”

After remarking on the astonishment of modern chymists when they had discovered of how few elements organized beings were composed, M. Dumas proceeds:—

“Have we not in fact proved, by an immense number of results, that animals constitute, in a chymical point of view, true apparatus of combustion, whence the burnt carbon, on the one hand, returns unceasingly to the atmosphere, under the form of carbonic acid; whilst the hydrogen, burning also uninterruptedly, continually engenders water; and lastly, whence free azote unceasingly exhales by the process of respiration, and also in the state of oxide of ammonium from the urinary organs. Thus, from the animal kingdom, considered as a whole, there constantly escapes carbonic

acid, aqueous vapour, azote, and oxide of ammonium, simple matters and few in number, the formation of which is closely connected with the history of the atmosphere we breathe."

For the information of the tyro we may mention that carbonic acid consists of carbon and oxygen, whilst water is composed of hydrogen and oxygen. This will afford a key to the following :

"Have we not proved, on the other hand, that plants, in their normal existence, decompose carbonic acid, in order to assimilate its carbon, by disengaging it from its oxygen?—that they decompose water, in order to seize its hydrogen, in like manner disengaging its oxygen also?—that, lastly, they borrow sometimes directly from the azote of the air, sometimes indirectly from the *azote of oxide of ammonium or nitric acid*; thus performing their functions on every side in a manner the inverse of that which is peculiar to animals? If the animal kingdom constitutes, then, an immense apparatus of combustion, the vegetable kingdom, in its turn, constitutes an immense apparatus of reduction, where the reduced carbonic acid leaves its carbon; where the reduced water leaves its hydrogen; where the reduced oxide of ammonium and nitric acid leave their ammonium or their nitrogen.

"If *animals* produce unceasingly carbonic acid, water, azote, oxide of ammonium, then *plants* consume as unceasingly oxide of ammonium, azote water, carbonic acid. That which the one gives to the air, the others take from the air; so that, in viewing these phenomena from the most elevated point of observation, in reference to the philosophy of the globe, we can truly say, concerning their essentially organic elements, that plants and animals engendered by, and deriving their subsistence from, the air, are merely that air condensed, and that in order to form a correct and just idea of the constitution of the atmosphere, at those epochs which have preceded the birth of the first organized beings on the surface of the globe, it would be necessary to render to the atmosphere, by calculation, that carbonic acid and azote whose elements plants and animals have appropriated to themselves.

"Plants and animals come, then, from the air, and thither return; they are veritable dependants on the atmosphere.

"Plants receive, then, unceasingly, from the air, that which animals have furnished to it—that is to say, carbon, hydrogen, and azote; or rather, carbonic acid, water, and ammonia. It remains now for us to detail in what manner animals procure those elements which they restore to the atmosphere; and it is impossible to observe, without admiration of that sublime simplicity which pervades the laws of nature, that animals invariably borrow these elements from the plants themselves."

We regret that our space will not allow of our making further extracts, in the present number, from this interesting work: we shall, however, return to it in our next.

## PRACTICAL PHARMACY.

ART. VIII.—MUSK: *being the first of a series of articles on Drugs of the Russian Trade.* By Dr. F. GOEBEL.

It is pretty well known that this substance is found secreted in a bag between the navel and the prepuce of the male musk deer, whose habitat is in the mountainous Kirgesian and San-



gorian steppes of the Altai, on the river Irtysh, extending eastwards as far as the river Jenesi and lake Baikal. It exists also in Mongolia, Thibet, and Butan or Bontan, as far as Tonquin, and generally on the mountains of Eastern Asia, ranging between 30° and 60° of latitude. In Persia, Syria, and Africa, the musk deer have not been found.

In trade, two distinct species of musk are known, which we shall distinguish as Musk *a*, comprising the Chinese Tonquin, Thibetian, or Oriental musk, and Musk *b*, which includes the Siberian, Cabardinian, or Russian musk. These varieties, which for the sake of brevity we shall term, the one Russian and the other Chinese, differ materially both in external appearance of the bag and the colour of the hair which covers it, as well as in their chymical and physical properties, and different effects on the human constitution.

It is generally supposed that these differences obtain chiefly on account of the difference in climate which the animals inhabit, and partly is to be attributed to the difference in food which such variations in temperature occasion. By some, however, it has been premised that to a difference in species may be attributed the differences of the drug. Dr. Goebel is of opinion rather that these different properties of Chinese musk, as compared with the Russian, should be mainly, if not entirely, attributed to the difference of treatment which they undergo in China, and he considers that the Chinese musk is the natural product after it has been subjected to the ingenious adulterations of the Chinese. The following are the reasons for this supposition:—

Irbit, a small town of Asiatic Russia, known chiefly for the considerable barter trade which is there carried on in the month of February between Russian, Bucharian, Chiwinzian Tribes, with Persian, Armenian, and other Asiatic nations, is also the main market for the Russian, or, as it is there termed, Siberian musk. It is less frequently taken to the market of Nischnei Novgorod. The Asiatics bring to Irbit the musk bags enveloped in the original greyish white skin, as cut from the belly of the musk deer, and sell them, either to the Russians, who carry them to St. Petersburg and Moscow; or, in the event of their not being able to drive a profitable trade with these merchants, they dispose of them to other Russian traders, who carry on a commerce with China by Kjachta.\*

The Russian merchants, who bring the musk from Irbit to St. Petersburg and Moscow, trade only between these towns and

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\* The little town of Kjachta is under the district government of Irkhutsk, on the frontiers of China, forming the chief commercial mart between Russia and China. It consists almost entirely of warehouses. On the Chinese side of the frontier, nearest to Kjachta, is the small Chinese town Maimatschin, where the Chinese Customs authorities reside. The trade consists chiefly of barter transactions.

Irbit, but those who carry it to Kjachta trade only between the said town of Kjachta and Irbit.

In case the price of musk is remunerating at St. Petersburg and Moscow, then the Russians who trade there purchase the musk bags, and pay good prices; on the other hand, when it is low in these places, the Asiatic finds his customer in the trader to Kjachta. Sometimes it is brought to St. Petersburg in large and sometimes in small parcels, occasionally packed in chests, whilst at others it is loosely carried in bags of leather or felt, and sold generally to druggists.

The price of musk at St. Petersburg is regulated by the quantity of stock in hand. The Russian trader procures European wares with the produce of his sale, which wares are destined to procure at Irbit a further supply of the drug. At St. Petersburg it is packed in tin caddies, hermetically soldered; and when exported, these are packed in small wooden cases.

The Irbit musk is invariably enveloped in the greyish-white belly skin, and the bags are separated when it is sent to St. Petersburg, this being done only after it has been sold to the St. Petersburg trader; for a bag accompanied with the skin rarely arrives at St. Petersburg. If, however, the musk is sold to those traders who proceed with their wares for the Chinese market *viâ* Kjachta, this appendage is indispensable, because the Chinese, who exchange tea for it, would not purchase it except in its original state. From Kjachta it is taken into the interior of China, and the process of adulteration it there undergoes is entirely unknown; but it is a fact, the authenticity of which is indisputable, *that no Russian musk bag is ever reimported from China viâ Kjachta*, the only trading mart between Russia and China; and further, *that not a single bag of Chinese musk ever arrives in Russia viâ Kjachta*.

In one year 300, 400, and even upwards of 500 pounds—I repeat *pounds*—of Russian musk have been carried to China by Kjachta. In such years it may be presumed that but little musk arrived at St. Petersburg, where the rise and fall of the market-price is governed by the quantity imported.

From St. Petersburg and Moscow there is annually exported a quantity of Russian musk amounting on an average to 500 pounds. Perhaps one half of this quantity is destined for the London market, where, more especially, the smallest bags are in demand, whilst the remainder is distributed amongst other European markets, more especially those of Holland and Germany, where the greater part is consumed. The price rises and falls according to the quantity brought from Irbit, amounting from 46 rub. silver, = £7. 7s. 7d., to 80 rub. silver, = £12. 16s. 8d. per lb. The price usually averages from 57 to 64 rub., = £9. 2s. 10d. to £10. 5s. 4d. per lb. From 20 to 24 bags will weigh one pound. Thus from 10,000 to 12,000 bags are

annually exported, without reference to those destined for China—affording a proof of how plentiful the musk deer must be in those countries.

The Russian musk, when exported from Russia, is always genuine and unadulterated; the bags never being opened, are consequently never sewn, or closed in any artificial manner. Sometimes it is obtained so fresh that moisture may be expressed therefrom by cutting through the fleshy side of the bag. The interior mass is frequently of a soft and pappy consistence; externally, however, the bags are perfectly dry.

Dyrssen, an eminent Russian merchant, proved to Dr. Goebel, by his books, that he annually exported, on an average, about 200 lbs. of Russian musk, and he stated, that through other houses at least a similar aggregate quantity was sold; and lastly, from Moscow, in the winter, there was sent, *viâ* Brody, to Vienna, and through other channels, at least 100 lbs. giving an annual total of 500 pounds of Russian musk, which he calculates, and expressly stated, was rather below than above the average quantity exported.

That which is termed Tonquin or Chinese musk comes into the market only through the London trade, and by no other channel, although much of this is consumed in Russia, no bag being ever received *viâ* Kjachta, but always imported directly from London. These Chinese musk bags are found, on examination, invariably to have been opened, and more or less carefully glued together; sometimes, indeed, the stitches are visible by which they are held together.

We have the assurance of Mr. Dyrssen, that during the many years he has been engaged in trade, although he has frequently received quantities of from 100 to 200 ounces at a time from London, yet in no case whatever has he met with a bag which had not been opened, and closed with more or less ingenuity. He believes also that he has recognized the Siberian bags, although somewhat modified. Whether the Chinese musk, in its peculiar package, is received in that state at the English factory at Canton, as is most probably the case, or whether it is there made up, we are not in a position to state. Dr. Fr. Goebel relates, that in the year 1825 he received, through Jobst and Klein, of Stuttgart, a Chinese musk bag, to which was adherent a portion of the skin attached to the belly and the genitals: this Dr. G. opened, in the presence of the eminent naturalist Oken, and it was represented by Ratzeburg and Brandt, in their description of officinal animals; and of which Oken gave an account in his *Isis*, and which appeared also in Kastner's Archives. This bag, which the Dr. has still in his possession, was of the same form, and in colour and size of the hairs, precisely similar to the Russian musk bag, with which he had an opportunity of comparing it whilst on a visit to Russia.

The contents, however, of this musk bag differed materially, in their chymical and physical properties, from those of the pure Siberian musk bag. Buchner, in his Repertory, has given a description of a musk bag, which coincides with that in Dr. G.'s possession. The weight of grain musk from this bag was 225 grains, and cost 80 Thaler conv. munze—about £4. 10s.

If we take a Chinese musk bag, with its partially bald surface and yellowish-brown hairs here and there cut off, and soften the same by digestion in warm water, we perceive pretty plainly that it has been subjected to artificial changes. The external skin is tender, and may be easily torn, as if it had been destroyed by partial decomposition; the hairs have either fallen off or been removed by force: indeed, the longer hairs clearly appear to have been cut off.

Why do not the musk bags from China arrive as perfect as those from Russia? Because the contents have been removed and the bags refilled, as may be distinctly perceived by the circumstance of those hairs which surround the interior small opening which is found on the hairy side of the bag, immediately before the genital canal, being depressed; whilst in the Russian musk bags these small hairs are found standing obliquely, and protruding in and between the secretion. It is possible, although not at all probable, that the musk deer, which abound in Thibet, Butan, &c. may possess musk bags of a perfectly distinct character from the Russian, but no trustworthy reference or practical judge has ever witnessed the removal of such a bag from the living animal, or described it and its contents. That the grain musk of the Chinese musk bags which have been brought to Europe, differs very much in its effects, as well as in its physical and chemical characters, from the pure Siberian, has been ascertained; and that it likewise acts with more energy on the living economy when administered internally. All the different chemical investigations of musk, for which we are indebted to Buchner, Wetzlar, Oberdoeffler, Thiemann, Blondeau and Guibourt, Geiger and Reiman, &c., taken together, afford very few hints in reply to those questions, which involuntarily present themselves, in reference to the two different kinds of musk, so far as regards their chemical and mercantile relations.

Taking, therefore, the most essential points of the preceding communication—

1stly. That the Russian musk is always sold in perfect bags, and exported in considerable quantities to China and to London;

2dly. That from China to Russia, no direct exportation of musk takes place;

3dly. That the Chinese musk can only be obtained via London;

4thly. That the Chinese musk bags never arrive unopened ;  
 5thly. That it appears most undoubtedly that the mass has been taken out and replaced ;

6thly. That the external appearance of the bags proves sufficiently that they have undergone artificial treatment ;

7thly. That frequently the secretion apart from the bag is imported from China, leading to the inference that a sufficient number of bags cannot be obtained wherein to put the quantity increased by adulteration ;—

Taking all these reasons into consideration, we think the conclusion announced at the commencement cannot be avoided, viz. that the distinctly marked difference of the Chinese from the Russian musk, if not wholly, is at any rate chiefly, caused by the treatment which it undergoes in China ; and therefore that Chinese musk is the natural product after it has been modified by artificial means.

M. Guibourt (in his *Histoire Abrégée des Drogues Simples*, tome 2<sup>ième</sup>, page 744), has given the following qualitative analysis of Chinese musk, undertaken by himself and M. Blondeau :—

1st, Water ; 2d, Ammonia ; 3d, Solid fat (Stearine) ; 4th, Liquid fat (Elaine) ; 5th, Cholesterine ; 6th, Acid oil, combined with ammonia ; 7th, Volatile oil ; 8—10th, Hydrochlorates of ammonia of potassa and lime ; 11th, An undetermined acid, partly saturated by the preceding bases ; 12th, Gelatin ; 13th, Albumen ; 14th, Fibrine ; 15th, Carbonaceous matter, soluble in water ; 16th, Calcareous salt, soluble by means of combustible acid ; 17th, Carbonate lime ; 18th, Hairs and Sand.

The quantity of water varies necessarily with the state of dryness of the musk : that examined by MM. Guibourt and Blondeau contained 0.46. The quantity of free ammonia, or that which is so feebly combined as to be disengaged by desiccation, varies in the same manner. The musk referred to contained 0.00325.

The solid and liquid fats were found to be identical with that of sheep and other ruminants ; the cholesterine appeared similar to that of human biliary calculi.

M. Guibourt then enters into the question as to whether musk be a secretion or an excretion, and quotes M. Berzelius as admitting that the former is invariably alkaline, whilst the latter is acid ; and thereupon he proceeds to enter upon the solution of this question in reference to the musk he had examined ; but as such musk was of the variety which, from the clear exposition of Dr. Goebel, we infer to be adulterated, the settlement of the question mooted must be deferred until we have a similarly trustworthy analysis of the pure Siberian or Cabardinian variety.

It is a fact worthy of remark, as shewing the ignorance which exists in reference to the places whence medicinal products are obtained, that notwithstanding the fact that London receives the greater quantity of Russian musk, yet that, in the Trades' List

and Prices-Current, no mention is ever made of Siberian or Cabardinian musk.

In reference to the quantity of musk on which duty has been paid, we find, on referring to the Customs' official documents, that, in the year 1842, up to June 28 inclusive, the duty of sixpence per ounce was paid on sixteen hundred and forty-three ounces, whilst, during the same term in 1841, only five hundred and one ounces were cleared.

At the port of London alone, from June 1841 to June 1842, duty was paid on nine hundred and sixty-nine ounces.

The *typographic* quotation of *China musk*, in the *London Trades' List*, is from 20s. to 70s. per ounce, whilst that of the Price Current is, for what is described as "good and fine," from 30s. to 55s. We say *typographic*, because these quotations have not varied for the last six months, during which time the commodity has fluctuated exceedingly.

At a public sale at Garraway's, April 7, 1842, ten caddies of musk, imported from Calcutta, were offered at 37s. per ounce in bond; at the same time, one caddy, of a finer quality, was sold, duty paid, after some competition, at 65s. 6d. per ounce.

On May 5, 1842, at the same rooms, some fine Cabardine musk was offered, but 18s. only having been bid for it, it was withdrawn.

The prices demanded at the present moment, for small quantities of *grain musk*, as the secretion taken from the bag is termed, we have ascertained to be 60s. and 95s. per ounce, according to quality; a few months since it reached to 120s. per ounce.

The chief exportations of musk, from the London market, are directed to Hamburg, Rotterdam, and St. Petersburg.

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#### ART. IX.—"Our Pharmacopœia."

UNDER the above title we purpose entering into the details of the LONDON PHARMACOPŒIA, by instituting comparisons with the formulæ of other Colleges, narrating the observations which have occurred to ourselves during some few years of laboratory practice, and reviewing the commentaries of the several translators of that work. In furtherance of this object, our pages will always be available to the contributions of practical men; as an encouragement to whom, we may observe, that we do not think our readers will expect us to render each article a subject of interest in itself, but will approve our intention of commenting on every preparation; so that, when complete, we shall have amassed a body of practical information, which we are sanguine enough to hope will not be without its fruits when a future edition of the London Pharmacopœia shall emanate from the College of Physicians; and in which Pharmacopœia we trust our friends will be enabled to recognise the value of their sug-

gestions, from the simple circumstance of their adoption. Such has been the result in other countries,—such must be the result in this ; and we believe we do not appeal in vain to those who can furnish this information, which the convenience of chymists and druggists no less than the public weal demands.

That it may not be inferred we seek to fill our pages with the result of our co-labourers' efforts for our own emolument, we will present a Gold Medal of the intrinsic value of ten guineas, or the same amount in specie if preferred, to the author of the best series of contributions, having for their subject the preparations of the London Pharmacopœia, without reference to the language in which they are communicated to us.

We commence the subject by a few remarks on ACETUM DISTILLATUM. We understand by the term acetum, the malt vinegar of commerce, No. 24 ; by the careful distillation of which, using glass or clean stone-ware vessels, we have always obtained a *colourless* dilute acid, of a slightly peculiar but agreeable odour, attributable to the etherification, or perhaps formation of pyroacetic spirit, which ensues, and the rationale of which change we believe to be as follows :—Vinegar, besides water, contains acetic, sulphuric, tartaric, and malic acids ; alcohol, ammonia, potassa, together with animal and vegetable matters. These last nitrogenous substances, at ordinary temperatures, are continually undergoing decay—the *eremacausis* of Liebig. On raising the temperature by distillation, water, alcohol, and acetic acid, pass over into the recipient, the process of eremacausis or slow decomposition is arrested, partial etherification ensues, with the formation perhaps of pyroacetic acid. By increasing the temperature, vegetable matter passes over, but if the process be properly conducted, and no more than 7-10ths be allowed to distil over, the product will be colourless ; when, however, the acetic acid is neutralized, or partially so only, with ammonia, as in making the Liq. ammon. acet., the vegetable matter, under the favouring influence of the alkali, is rapidly decomposed ; which process is facilitated by the air which is present in all liquids exposed to the atmosphere at usual temperatures, the oxygen of which air combines with the vegetable matter, and the liquid becomes coloured. If, again, the distillation has been conducted too far, or at too high a temperature, the vegetable and animal matters are partially decomposed, giving rise to pyroacetic acid and ammonia ; which latter favours the decomposition, as before stated, of the vegetable matter, being assisted by the air which the condensed liquid has absorbed, and the product is coloured. We may here mention, that if the shoulder and sides of the retort be protected with felt\* made of cow-hair, the rapidity of the process

\* May be obtained of Messrs. Borradaile, Barge Yard, Bucklersbury.

is very materially increased; the cooling of the retort by the currents of air playing on it, being entirely obviated.\*

Acetum distillatum has long been preferred, by the practitioner who dispenses his own medicines, to the acidum aceticum dilutum; and probably to the slight etherification, as well as the absence of sulphuric acid, which the latter always contains, may be attributed the preference which the observant medical man has given to the former, a preference which, our experience has in several instances taught us, no *mis-labelling* can divert.

Since writing the above, we have referred to Dr. Christison's Commentary on the Pharmacopœias, and we are glad to find ourselves consistent with so respectable an authority in all matters relating to therapeutics. We may be allowed to observe, that we think Dr. Collier has been guilty of an oversight, in his valuable Supplement, calculated indirectly to mislead the dispenser; since, in his remarks on the Liq. ammon. acet., dilute pyroligneous acid is mentioned, whilst the acetum distillatum is ordered by the College; for assuredly there does exist a difference of medicinal properties in these two acids, perhaps referrible to the creasote contained in the former. Convenience, and a false economy, may lead to the substitution of pyroligneous acid diluted, but we think the dispenser incurs needless risk by having recourse to it.

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#### ART. X.—*Concentrated Infusions—how to prepare.*

FOR many years, preparations under the above title have been a common article in the wholesale trade; usually they have been empirically made, with various degrees of success, but in all cases with some slight mystery as to the method pursued by each operator, who usually affects to practise some peculiarity of process, whereby to divert the annoying curiosity which eminently abounds in wholesale houses, where the would-be learners by a short route bear a large proportion to the steady indefatigable investigators for themselves. The desiderata to be attained in these medicines, are—

1st. To produce them perfectly bright.

2dly. To make them keep.

3dly. To secure an article which, on dilution with seven parts of water, the usual proportion, cannot be distinguished from the recent infusion, and possessing similar medicinal properties.

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\* To those general readers who may carp at the prolixity with which so apparently trivial a subject is treated, we beg first to observe, Chymistry is made up of minutiae trivial in themselves; and further, we would refer them to Professor Graham's Letter to the Earl of Aberdeen, page 25, wherein is narrated, in the words of Liebig, the method of instruction pursued on the first admission of pupils to Laboratory practice at the University of Giessen.



When we reflect on the imperfect state of our knowledge a few years since, in reference to the proximate principles of vegetables, and the facility with which they are decomposed, less surprise will be felt that empirical attempts, founded on blind guesswork, led to no better results ; but now that the most humble employé, in consequence of the exertions which are being made on all sides by practical chemists to raise their character, is stimulated to ascertain the wherefore this precipitate occurs, and why that decomposition ensues, concentrated infusions, in common with other vegetable preparations, have become not only better understood, but we are convinced, when the formulæ by which they are prepared become well known, their consumption will be materially increased. Wholesale houses may rest assured they may always maintain their position by quality and a systematic attention to business, far more securely than a blind hesitation in the diffusion of their processes, which hesitation alone gives them value, at the same time it considerably diminishes consumption, for the retail consumer is thereby led to apprehend he is made to pay an enormous profit, when, in reality, left to himself, he would not be able to effect so perfect a product at any thing like the same rate.

## INFUSUM SENNÆ CONCENTRATUM.

	lb.	oz. ( <i>Avoir.</i> )
R. Senna Alex. op. . . . .	3	0
Zingib. Jam. Incis . . . .	1	10
S. V. R. . . . .	5	0

Macera per dies septem, exprime, et cola ; sepone et signe " Tinctura," tunc digere residua, cum Sennâ Alex. 18 lbs. *Av.*

Aquâ Dist. frig. Cong. 7.

Macera per horas duodecim, exprime et cola, redige hunc liquorem, super balneo aquæ bullientis cautè separato albumine in eo coacto et evapora ad libras sexdecim. *Av.*—Iterum Macera residua per horas duas, in aquæ distillatæ frigidæ congiis duobus. Exprime, et cola, tunc misce cum liquore evaporante quod redigendum erat ad libras sexdecim.

The proportion of spirit in the above concentrated infusion of senna exceeds that which it is customary to add to other infusions ; but when we bear in mind the portion which is absorbed by the senna and ginger, and which is afterwards lost by evaporation, as also the facility with which the infusion otherwise prepared undergoes decomposition, and moreover that the stimulus which, excepting its additional cost, is the only objection that can be urged against it, and which in this preparation has no injurious effect ; and lastly, that the product certainly does combine, in an eminent degree, the desiderata which we announced at the commencement of this paper, together with the fragrance of the senna, we think our formula will answer the purpose for which it was intended, viz. " practical application."

ART. XI.—*On the Perfume of the Quince.*

It may have been remarked by many, that the quince possesses an odour strongly resembling cœnanthic ether. This odour may be noticed more especially in the rind. I separated the rinds from forty ripe quinces, and distilled them with water. There floated on the distilled liquor—which tasted very distinctly, and possessed the characteristic odour, of the quince—a few drops of an oily matter, which, by a repetition of the distillation, was somewhat increased. The whole quantity of oily matter obtained however, was only one large drop; it possessed in an intense degree the agreeable odour of the quince. It was then distilled with a solution of pure potassa, until the distilled liquor came over inodorous. During this process an ethereal oil of similar odour passed over. By saturating with sulphuric acid (dilute?) the inodorous solution of potassa, it became milky; and on heating, a liquid fatty matter separated, which, at about  $+ 10^{\circ}$  R. =  $55^{\circ}$  F. was solid and without smell, but easily liquefied, and was readily redissolved in a solution of potassa, from which it might be separated in a milky state by means of an acid. These reactions seem to indicate that the quince contains absolute cœnanthic ether; but further experiments, on larger quantities, are required to verify this inference. If correct it would be interesting, as affording the first instance of a combination of ether existing ready formed in nature.—*Liebig's Annalen der Chemie*, Feb. 1842.

ART. XII.—*Anthracokali.*

ANTHRACOKALI is the name given by Dr. Polya to a remedy which he has found useful in certain herpetic affections. Dr. P. distinguishes two preparations under the several titles of simple and sulphurated anthracokali.

The simple is prepared by mixing in an iron pan 160 parts of levigated coal dust with 192 parts of a very concentrated and boiling solution of pure potassa. When the mixture is perfect it is removed from the fire, and continually stirred with a pestle until it is converted into a black homogeneous powder. This powder is preserved in bottles previously warmed, and when the remedy has been introduced they should be well corked. To prepare the anthracokali sulphuratum, 16 parts of sulphur are mixed with 160 parts of levigated coal dust, and caustic potassa is added thereto, as previously directed. Anthracokali simplex is a black deliquescent powder, very soluble in water. A solution prepared with cold water is of a dark-brown colour; a solution of the anthracokali sulphuratum is of a blackish-green. Either

of them, treated with a mineral acid, precipitates black flakes, which gradually unite into a mass.

Dr. Polya administers these remedies, three or four times a-day, in doses of one grain and a half each, mixed with about four grains of liquorice powder or carbonate of magnesia. Sometimes he adds, according to the symptoms indicated, calomel, golden sulphuret of antimony, &c.

[As journalists we feel it to be our duty to give the formula for any preparation that may be introduced to medical practitioners, but we may be allowed to express our opinion that the above is rather a retrograde movement in the present age of cause and effect. Dr. P. sets a high value, however, on his remedy, and the publication of his formula is the strongest proof of such estimation he can furnish.—Ed.]

## GALVANISM AND ELECTRICITY.

### ART. XIII.—*Gilding by the Moist Way.*

A VERY excellent method of gilding by the moist way consists in communicating a negative electric state, by means of a feeble hydro-electric current, to the metal which is sought to be gilded, and which is immersed in a dilute solution of gold. This solution ought not to contain more than 5 or at the most 10\* milligrammes of gold for each cubic centimeter of liquid, which should be as exempt from free acid as possible. Pour the solution of gold into a glass cylinder, whose lower extremity is hermetically closed with moistened gut-skin, and introduce the cylinder into a vessel which contains some water, acidulated with a few drops of sulphuric acid. The cylinder should be supported so as to prevent its lower surface from resting immediately on the bottom of the larger vessel. It is necessary to clean carefully, or even polish, the surface of the metal, whether silver or brass, that we desire to gild, lest a portion of it should be left ungilt. To attain this end, it is sometimes advisable to place the metal for a few moments in contact with zinc, in dilute sulphuric acid, so that hydrogen may be disengaged on its sur-

\* A French millogramme bears the proportion to an English troy grain of  $\cdot 0154$  to 1·000; a cubic centimeter of distilled water, at a temperature of  $39^{\circ} 5$  F., at which this density of water is greatest, is termed by the same nation a gramme, and bears to the previously cited decimals the proportion expressed by 15·4340. In common parlance we should say, then—

“The solution ought not to contain more than from *half* to *one per cent.* of gold, and should be,” &c.—Ed.

face; after which it must be well washed. In order to gild an object, it must be fixed or suspended by a platina wire, to the other extremity of which is attached a plate of zinc; this done, plunge the article to be gilt in the solution of gold, and the zinc plate into the acidulated water. The power of the electric current may be moderated at will, by immersing more or less of the zinc plate, so that no hydrogen may be disengaged, and in this case the chloride of gold is alone decomposed. After a minute the article to be gilt is withdrawn, wiped dry with a fine linen cloth, rubbed a little, and again immersed. After two or three immersions, the metal will be found to have been sufficiently gilt.—*M. de la Rive.*

A most elegant application of the preceding process has been used for engraving copper plates, with aquafortis. The polished surface is gilt according to the preceding direction, after which the engraving is confined to merely removing the film of gold from the parts to be acted on. The plate is then immersed in aquafortis, in the usual manner. The acid leaves the gold intact, acting only upon the lines; so that it is easy afterwards to correct a fault which may have escaped observation, without the tedious process of re-covering with wax, &c. Moreover, the plate may be preserved without corrosion for years.—*M. Hamman.*

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#### ART. XIV.—*Platinising by the Moist Way.*

MANUFACTURING and operative chemists will find exceedingly valuable an adaptation of the same method, in order to produce a covering of platina for their copper, &c. vessels. The experiment succeeds best when we make use of a dilute solution of the double chloride of soda and platina. Three immersions suffice; between each immersion it is necessary to dry the surface with fine linen, rubbing rather briskly, after which it must be cleaned with levigated chalk before re-immersion. When copper has been gilded in the moist way, the gilt surface has not a beautiful tint; but if the copper be previously covered with a pellicle of platina, a very beautiful golden surface may be produced.—*M. Boettger.*

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#### ALPHABETICAL TABLE OF ATOMIC WEIGHTS, &c.

[We are obliged to defer, till our next number, an introduction to the following tables of J. J. BERZELIUS, wherein we intend to enter fully upon the subject of Equivalents, and shall for that purpose borrow largely from the 5th volume of the last edition, by Woehler, of Berzelius's *Lehrbuch der Chemie*.—Ed.]

NOMINA.	FORMULÆ.
<i>Acetal</i> . . . . .	$\dot{\text{Ae}}_3 \bar{\text{A}}$ . . . . .
Acetas tri Ætherosus.	
<i>Acetas</i> Aluminicus. . . . .	$\ddot{\text{Al}}_3 \bar{\text{A}}^3$ . . . . .
	$\frac{1}{3}$ . . . . .
— Ammonicus. . . . .	$\text{N}_3 \text{H}_3 \bar{\text{A}}$ . . . . .
— Argenticus. . . . .	$\dot{\text{Ag}} \bar{\text{A}}$ . . . . .
— Baryticus. . . . .	$\dot{\text{Ba}} \bar{\text{A}}$ . . . . .
— — cum aqua. . . . .	$\dot{\text{Ba}} \bar{\text{A}} + \text{H}_3$ . . . . .
— Bismuthicus. . . . .	$\dot{\text{Bi}} \bar{\text{A}}$ . . . . .
— Cadmicus. . . . .	$\dot{\text{Cd}} \bar{\text{A}}$ . . . . .
— Calcicus. . . . .	$\dot{\text{Ca}} \bar{\text{A}}$ . . . . .
— Cericus. . . . .	$\ddot{\text{Ce}}_3 \text{A}^3$ . . . . .
	$\frac{1}{3}$ . . . . .
— Cerosus. . . . .	$\dot{\text{Ce}} \bar{\text{A}}$ . . . . .
— Chromicus. . . . .	$\ddot{\text{Cr}}_3 \bar{\text{A}}^3$ . . . . .
	$\frac{1}{3}$ . . . . .
— Cobalticus. . . . .	$\dot{\text{Co}} \bar{\text{A}}$ . . . . .
— Cupricus. . . . .	$\dot{\text{Cu}} \bar{\text{A}}$ . . . . .
— — cum aqua. . . . .	$\dot{\text{Cu}} \bar{\text{A}} + \text{H}_3$ . . . . .
— sesqui Cupricus c. a. . . . .	$\dot{\text{Cu}}^3 \bar{\text{A}}_3 + 6\text{H}_3$ . . . . .
— bi Cupricus cum aqua. . . . .	$\dot{\text{Cu}}^3 \bar{\text{A}} + 6\text{H}_3$ . . . . .
— tri Cupricus. . . . .	$\dot{\text{Cu}}^3 \bar{\text{A}}$ . . . . .
— — cum aqua. . . . .	$2\dot{\text{Cu}}^3 \bar{\text{A}} + 3\text{H}_3$ . . . . .
— super Cupricus c. a. . . . .	$\dot{\text{Cu}}^4 \bar{\text{A}} + 12\text{H}_3$ . . . . .
— Cuprosus. . . . .	$\dot{\text{Cu}}_3 \bar{\text{A}}$ . . . . .
— Ferricus. . . . .	$\ddot{\text{Fe}}_3 \bar{\text{A}}^3$ . . . . .
	$\frac{1}{3}$ . . . . .

PONDERA ATOMORUM.		PARTES CENTESIMALES.		
O = 100.	H <sub>a</sub> = 1.	+ E.	— E.	H vel H <sub>a</sub> .
		C = 59,73	O = 29,80	H = 10,97
2047,63	164,08	68,59	31,41	
2571,90	206,09	24,97	75,03	
857,30	68,70			
970,14	77,74	33,70	66,30	
2094,80	167,86	69,30	30,70	
1600,07	128,21	59,80	40,20	
1712,55	137,23	55,87	37,56	6,57
1630,11	130,62	60,54	39,46	
1439,96	115,38	55,33	44,67	
999,21	80,67	35,63	64,37	
3378,96	270,76	42,89	57,11	
1126,32	90,25			
1317,88	105,64	51,20	48,80	
2933,20	235,04	34,22	65,78	
977,73	78,35			
1112,18	89,12	42,17	57,83	
1138,88	91,26	43,52	56,48	
1251,36	100,27	39,61	51,40	8,99
3448,34	276,32	43,13	37,30	19,57
2309,46	185,06	42,93	27,85	29,22
2130,27	170,70	69,81	30,19	
4597,99	368,44	64,68	27,98	7,34
25786,30	2066,28	92,27	2,49	5,24
1534,58	122,97	58,09	41,91	
2907,97	233,02	33,65	66,35	
969,32	77,67			

NOMINA.	FORMULÆ.
<i>Acetas</i> Ferrosus. . . . .	Fe $\bar{A}$ . . . . .
— Glucanicus. . . . .	$\ddot{G}_s \bar{A}^s$ . . . . .
	$\dagger$ . . . . .
— Hydrargyricus. . . . .	Hg $\bar{A}$ . . . . .
— Hydrargyrosus. . . . .	Hg <sub>s</sub> $\bar{A}$ . . . . .
— Hydricus gr. sp. 1,063. .	H <sub>s</sub> $\bar{A}$ . . . . .
— tri Hydricus gr. sp. 1,0791	H <sub>s</sub> <sup>s</sup> $\bar{A}$ . . . . .
— Kalicus. . . . .	K $\bar{A}$ . . . . .
— Lithicus. . . . .	L $\bar{A}$ . . . . .
— Magnesicus. . . . .	Mg $\bar{A}$ . . . . .
— Manganosus. . . . .	Mn $\bar{A}$ . . . . .
— Molybdicus. . . . .	Mo $\bar{A}^s$ . . . . .
	$\dagger$ . . . . .
— Molybdosus. . . . .	Mo $\bar{A}$ . . . . .
— Natricus. . . . .	Na $\bar{A}$ . . . . .
— — cum aqua. . . . .	Na $\bar{A}$ + 6H <sub>s</sub> . . . . .
— Niccolicus. . . . .	Ni $\bar{A}$ . . . . .
— Palladosus. . . . .	Pd $\bar{A}$ . . . . .
— Platinosus. . . . .	Pt $\bar{A}$ . . . . .
— Plumbicus. . . . .	Pb $\bar{A}$ . . . . .
— — cum aqua. . . . .	Pb $\bar{A}$ + 3H <sub>s</sub> . . . . .
— tri Plumbicus. . . . .	Pb <sup>s</sup> $\bar{A}$ . . . . .
— se Plumbicus. . . . .	Pb <sup>s</sup> $\bar{A}$ . . . . .
— Rhodicus. . . . .	$\ddot{R}_s \bar{A}^s$ . . . . .
	$\dagger$ . . . . .
— Stannicus.. . . . .	Sn $\bar{A}^s$ . . . . .

PONDERA ATOMORUM.		PARTES CENTESIMALES.		
O = 100,	H <sub>2</sub> = 1.	+ E.	— E.	H vel H <sub>2</sub> .
1082,39	86,73	40,58	59,42	
2892,09	231,74	33,28	66,72	
964,03	77,25			
2009,01	160,98	67,98	32,02	
3274,83	262,41	80,36	19,64	
755,67	60,55		85,12	14,88
980,63	78,58		65,59	34,41
1233,10	98,81	47,84	52,16	
823,52	65,99	21,90	78,10	
901,54	72,24	28,66	71,34	
1089,08	87,27	40,94	59,06	
2084,90	167,06	38,30	61,70	
1042,45	83,53			
1341,71	107,51	52,06	47,94	
1034,09	82,86	37,80	62,20	
1708,96	136,94	22,87	37,64	39,49
1112,86	89,17	42,20	57,80	
1409,09	112,91	54,35	45,65	
1976,69	158,39	67,46	32,54	
2037,69	163,28	68,44	31,56	
2375,12	190,32	58,71	27,08	14,21
4826,68	386,77	86,67	13,33	
9010,17	721,99	92,86	7,14	
3532,34	283,05	45,37	54,63	
1177,45	94,35			
2221,67	178,02	42,10	57,90	



ART. XVI.—*Preparation of Lactate of the Protoxide of Iron (in the Laboratory of M. Batka).* By JULIUS RASSMAN.

THE writer prepared the lactic acid by Boutron and Fremy's formula, *i. e.* by acidifying milk to which sugar of milk had been added, and repeatedly saturating the lactic acid which formed with bicarbonate of soda, and then decomposing the lactate of soda, dissolved in spirit of wine, by sulphuric acid.

He next distilled the spirit of wine from the lactic acid, and diluted this latter with the requisite quantity of water. This was heated to the boiling point, and iron filings were added in excess thereto. The solution was then boiled, until no further disengagement of gas ensued; and lastly, whilst yet hot, was filtered into a vessel, and closely stopped. On cooling, the blackish-green solution had deposited a considerable quantity of lactate of protoxide of iron, in small crystals. These were collected on a filter, and washed first with a little water, and afterwards with spirit of wine; by which process they were obtained quite colourless, and remained so after being dried. The mother liquor, on being digested anew with a few iron filings, and evaporated, gave a further crop of crystals, which, treated in the manner previously related, yielded a product whose appearance left nothing to be desired.—*Buchner's Repertorium.*

[The reader will recognize in the above formula (which yields lactate of protoxide of iron, an almost insoluble salt) a close similarity at the commencement of the process to that which we have given for procuring the ammonio-citrate of peroxide of iron; and it needs but the following modification to produce the very soluble ammonio-lactate of peroxide of iron:—Neutralize the blackish-green filtered solution of lactate of iron with liquor of ammonia; evaporate in an open vessel; and when it has become of a consistence approaching to molasses, apply on plates, in the manner directed for the citrate.—ED.]

The *Echo du Monde Savant* states that a person possessing a large flock of sheep has cured the whole of them, which had the pleurisy, by giving to each animal an ounce of arsenic, mixed with salt, and that he has tried the same remedy on a cow, without the least indication of poison. It seems the stomachs of such animals differ from our's. M. Orfete, who is now at Brussels, will, it is said, ascertain whether the flock of animals so cured would be poisonous when used as food for man.—*Times.*

[We have addressed a letter to our correspondent at Brussels, with a view to lay the particulars before our readers.—ED.]

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\* \* \* *Communications, Books for Review, &c. are requested to be addressed*—“To the Editors of the ANNALS OF CHYMISTRY, care of Messrs. Longman, Brown, and Co. Paternoster Row.”

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WILSON AND OGILVY, 57, SKINNER STREET, SNOWHILL, LONDON.

THE  
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AND  
PRACTICAL PHARMACY.

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FRENCH AND ENGLISH DRUGGISTS.

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WHETHER the inquiring English chymist amuses himself with a trip to France, or whether he peruses French journals at his quiet fireside, there is a circumstance which rarely escapes his observation—we mean the prohibition of the sale of secret remedies, unless legally protected by patent, a privilege which is never granted without a report from the Royal Academy of Medicine, certifying the harmlessness of the remedy. This is a sad let and hindrance to the sale of those popular compounds, but by no means the only one. Our London warning—"Bill-stickers, beware!" is thundered forth with more authority by the French law; and it would appear that the Parisian quack is destroyed, like a parasitic plant, by removing him from the wall on which he thrives. This fact is exemplified in the following extract:—

"A practitioner having caused a placard to be affixed on the walls of the shop of M. S., a grocer residing in the Rue St. Denis, advertising a remedy against secret complaints, he brought an action against the doctor, who was condemned in 50 fr. (£2.) damages. The court cautioned Dr. Ch. M. not to affix placards, for the future, on the walls of M. S.'s shop, lest he should incur renewed actions for damages, which might be demanded, and would certainly be recoverable."

If it were made illegal (continues the journalist) to post the merits of medicines on the walls, or to advertise them in the newspapers, neither quack-medicines nor quack-doctors could exist.

This is true enough; few charlatans, and but fewer empirical preparations, could stand this modification of the silent system.

But legislators have much indulgence for human frailty ; and as the Vicar of Wakefield assures us that he was tired of being always reasonable, so even continental codes shrink from pursuing the victory over infallible elixirs to the last extremity.

We will quote another late incident in France, which is peculiarly *à propos* to the present agitation for a charter by English druggists. It may teach them not to press the example of their continental brethren too eagerly on the legislature, lest their petitions should be answered by restrictions similar to those which hamper the *pharmaciens* of France. It is easy to conceive that too anxious a desire to obtain a charter might blind them to the painful conditions by which it was embittered.

M. THEODORE BOUBÉE is a regularly educated *pharmacien*, rivalling M. BÉRAL in the preparation of citrate of iron; and established at Auch (Gers.)

Ambitious to deserve well of his country, Mons. B., in an evil hour, contrived a syrup intended to banish gout from *la belle France* ; he affixed his name to it, and as time wore on, it was very naturally sold in several shops at Paris. The citrate of iron went on well—*In ferro est aliquid divinum*, says BOERHAAVE—not so the syrup, which turned out as uncomfortable as the disease which it professed to cure. Eminent men, even on this side of the water, are subject to fits of forgetfulness ; some have forgotten to pay their debts, and others have forgotten themselves altogether : M. BOUBÉE forgot to register the exact composition of his sedative solution.

This fit of oblivion, or *distraction*, at once turned the syrup into a secret remedy or nostrum ; and having violated the laws to which he had subscribed, he was forthwith cited before “ Le tribunal de première instance, 7<sup>ième</sup> chambre,” to answer for the high crime and misdemeanor which had been imputed to him, viz. *the advertisement and sale of secret remedies*. Not appearing, the unfortunate *pharmacien* is condemned, in default, to *ten months' imprisonment, and a fine of 600 fr. = £24.\**

To our English feelings this sentence appears unreasonably severe, as we cannot help thinking that an imprisonment of two or three months would have answered every purpose of admonition and example. Here, on the other hand, we err on the

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\* Journ. de Chimie Médicale, Sept.

side of lenity; every man vends whatever stuff he pleases; and some druggists imagine that their prosperity depends on the sale of quack remedies.

We are fully persuaded, on the contrary, that if the question were thoroughly sifted, it would be seen that the interests of patent medicine owners were strongly opposed to the well-doing of respectable druggists: nor can we refrain from expressing the opinion we have long held in reference to the proprietor of a secret remedy, the vendor, and the public—whom we regard respectively as the knave, the paid tool, and the victim. Still, a riddance from these pests may be paid for too dearly\*.

When the English druggist hears of the large profits made in some continental towns, where one or two *pharmaciens* enjoy a monopoly of the trade, he thinks that it must be delightful to occupy such a position, sheltered, by the authority of the state, from the depressing proximity of competition. But, alas! no rose is without a thorn; and if even the rich monopoly of the continental *pharmacien* would be too dearly bought by the jealous restrictions of a continental code, what can be said in favour of an act of parliament which would exclude but few competitors, yet might impose many restraints? The dreamy inactivity of King Log was surely far more agreeable than the unsparing severity of King Stork.

## CHYMISTRY, OPERATIVE AND EXPERIMENTAL.

### ART. II.—*Researches on Organic Bases.* By CH. GERHARDT.

ORGANIC bases have hitherto been only examined in reference to their saline combinations; meanwhile their behaviour towards chymical reagents has not been investigated. Having undertaken some experiments as to the action of potash on organic

\* Calculating the duty on patent medicines to average 10 per cent. on the short price of the medicine, and estimating such duty at £70,000 per annum—an amount which we have ascertained, on investigation, it surpasses—there is annually expended by the public £770,000 for these noisome compounds, of which sum government receives £70,000. The wholesale and retail dealers absorb 40 per cent. on the short price, or £280,000. The proprietor obtains about a similar amount, leaving in the hands of those who have parted with £770,000, pills and tinctures which it has cost £140,000 to compound; the rest of the victims' money being accounted for by the profits of proprietors and dealers, government duty, and the price paid for advertisements and newspaper puffs.

bases, I may be allowed to hope that the following remarks on these interesting bodies will prove useful.

Quinine, under the influence of pure potassa, is converted into a new nitrogenous and (provided it occurs at the ordinary temperatures) oily base. This new combination, which I term *Quinoilin*, is prepared as follows:—

I boil one part of quinine with four parts of pure potassa and one part of water, in a small retort, to which is adapted a receiver. In a short time the quinine becomes brown, the mixture swells up, owing to the development of hydrogen, and a yellowish oil of a peculiar and strong odour, perfectly distinct from that of empyreumatic oil, passes over with the aqueous vapour. It is heavier than water, and if the process be carefully conducted, may be obtained nearly colourless.

No ammonia will be developed during the reaction, provided care be taken so as not to fuse the potassa, and that the water which evaporates be occasionally replaced.

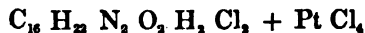
The oil thus obtained has a distinct alkaline reaction; it renders blue litmus paper previously reddened, and strikes a dark brown colour with turmeric paper.

It is perfectly soluble in acids, and forms with them crystallizable salts.

With sulphuric acid, it forms a salt easily dissolved in water, and yielding radiated crystals.

The double salt with platina is the most easily obtained of any. If the raw oil be dissolved in a slight excess of hydrochloric acid, and the chloride of platina be added thereto, there is immediately formed a yellow precipitate, which is to be received on a filter and redissolved in boiling water, whence it separates on cooling, in needles of a beautiful golden colour. If the oil contains ammonia, it must be allowed to remain twenty-four hours exposed to the atmosphere, when the product yields beautiful crystals of extreme purity. In the event of the ammonia not being perfectly evaporated, the combination of the quinoilin with the platina salt does not crystallize perfectly, owing to the formation of platino-muriate of ammonia.

This beautiful salt gave, on analysis, 28 per cent. of platina, 33 per cent. carbon, and 3.2 per cent. hydrogen; which agrees with the formula—



and, according to this, the quinine is converted into quinoilin by the separation of the elements of carbonic acid, which unite with the potassa. The oxygen of the water of the hydrated potassa combines with the carbon, forming carbonic acid. Thus we have—



I do not, however, consider the above formula finally settled, since I intend subjecting that of quinine, on which it is based, to revision. Most undoubtedly that of Regnault is inaccurate, although I have reason to believe that the *analyses* of this chymist are exact. According to these analyses, and taking the atomic weight at 75, is founded the calculation of the above formula for quinine. My recent analyses of strychnine verify the composition of that base, as adopted by Regnault. I have, however, to correct his formula to



Quinoilin forms a white crystalline combination with chloride mercury, soluble in boiling, but insoluble in cold, water. It is prepared in the same manner as the double salt of platina. The action of hydrated potassa on quinine extends also to other bases. I have obtained with strychnine, narcotine, &c. liquid bases; the reaction, however, with these, is not so simple as with quinine. A small quantity only of alkaline oil is obtained, but in lieu thereof, if the operation be interrupted at the proper moment, a residue will be found, consisting of potash salt, in combination with one or more peculiar acids, which, however, I have not yet been able to separate in a pure state. The acid which is formed during the decomposition of strychnine, assumes, on exposure to the air, a beautiful red colour.—*Liebig's Annalen*.

#### ART. III.—*Hyposulphite Soda: Capaun's Process.*

**Boil.** a dilute solution of caustic soda with sulphur until saturated. Then pass sulphurous acid gas into the solution, until there remains but a very small portion of  $\text{Na S}^5$  undecomposed. This may be ascertained by filtering a small portion of the solution, which ought to have a very pale yellow colour. If this is found to be the case, the whole of the solution is filtered and evaporated by boiling to a syrupy consistence. The ambient air, during evaporation, acts upon the  $\text{Na S}^5$  which remains in the liquor, and converts it into hyposulphite soda. This last-mentioned salt crystallizes from the syrupy solution. When the salt is dry, it is unalterable in the air.

If there still remains some sulphuret of soda in the syrup, with a view to its removal it is simply necessary to mix it with one half of its weight of alcohol, and shake it well. The alcohol takes up the sulphuret of soda, and swims on the surface of the aqueous solution, which latter is set aside to crystallize, without removing the supernatant alcoholic layer.

Berzelius, in reference to the above process, observes:—It appears to me that it would be more advantageous to modify this operation in such manner as to procure the bisulphite by satu-

rating a solution of carbonate soda with sulphurous acid gas, disengaged from bruised charcoal by sulphuric acid. Then mix with this solution (of bisulphite soda) the sulphuret of sodium, prepared in the moist way above mentioned, in slight excess; filter, evaporate, and set aside to crystallize.—*Jahrsbericht ueb. d. Fortschr. d. chem. u. phys. Wiss. von Berzelius.*

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ART. IV.—*On the Formation of Sulphuric Acid as an occasional Product in Preparing Milk of Sulphur.* By E. SOUBEIRAN.

It is supposed that in reducing some metallic oxides to lower degrees of oxidation by means of sulphuretted hydrogen, water is formed and sulphur separated. According to H. Rose, sulphuric acid is occasionally produced under similar circumstances.

In a cold solution of oxide of iron, no sulphuric acid is formed by the action of sulphuretted hydrogen. In a cold solution of chloride of iron, be it acid or neutral, sulphuretted hydrogen produces merely a precipitate of sulphur. If the solution be heated, however, during the introduction of sulphuretted hydrogen, sulphuric acid will be formed.

This fact should not be overlooked in any case where the quantity of peroxide of iron, in a solution containing also protoxide of iron, has to be ascertained, by the quantity of sulphur precipitated by means of sulphuretted hydrogen. In such a case, the introduction of sulphuretted hydrogen should only be performed at a low temperature.

A dilute solution of neutral chromate of potash, mixed with acetic or hydrochloric acid, yields to the same influence, with this addition, that at a higher temperature sulphuric acid is produced in still greater quantity.

In a solution of hydriodate potassa, or soda, or of bromide of potassium, sulphuric acid begins to be formed even at a low temperature; in a solution of chlorate or perchlorate of potassa, however, neither at a low nor high temperature is sulphuric acid formed.—*Journ. de Pharm.*

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ART. V.—*Profitable Method of Preparing the Chlorate of Potassa.*

If in lieu of passing the chlorine through a solution of carbonate of potassa, the greater part of the latter be replaced by carbonate of lime, this does not in the least affect the purity of the product, whilst the process is conducted at a much more economical rate.

Graham's method consists in submitting an intimate mixture of equal equivalents of carbonate of potassa and hydrate of lime to the action of chlorine. The hydrate of lime serves to remove the carbonic acid of the potassa, which otherwise separates less

readily therefrom, at least in the latter portions. This process did not, then, effect any saving of potassa.

The process which is followed in the laboratory of Giessen possesses a decided advantage in this respect. The chlorine is passed into a mixture of one equivalent of chloride of potassium, and six equivalents of hydrate of lime, previously stirred with water to the consistence of a thin paste, whereby the lime unites with the chlorine, forming chloride of calcium, and the chloride of potassium is converted into chlorate potassa, and the latter is then separated by crystallization.—*Buchner's Reperit.*

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ART. VI.—*Hermalane.*

THE Professor of Chymistry at Dorpat (Dr. Goebel) has succeeded in obtaining from the seed of the Hermal plant (the *Peganum harmala*, *Lin.*), which grows wild in the salt steppes of the Crimea, a beautiful colouring substance, in large quantity, to which he has given the name of Hermalane. The preparation of this colouring substance is said to be unexpensive, and promises to become in time an important object of Russian industry.—*Hbgen. Corresp.* 15th Sept.

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ART. VII.—*New Platina Salt.*

DURING some investigations of the cyanides of platina and iridium, Mr. Knopp discovered a new and very remarkable platina salt, with a closer examination of which he is now occupied. It is procured from the double cyanide of Gmelin, and it also forms a double cyanide with cyanide of potassium. It crystallizes in fine prisms, distinguished by their cupreous metallic lustre, exactly resembling metallic copper. Under the microscope, however, the transparency of the crystals becomes apparent; they are tinged by a pale green colour, easily soluble in water, forming a colourless solution.—*Liebig's Annalen.*

[This salt has also been discovered by Professor Erdmann, as we learn from a private letter.—(*Note by Liebig.*)]

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ART. VIII.—*Ferro-sulphate of Quinine.*

It was fairly to be inferred, from the analogy subsisting between salts of potassa or ammonia, and compounds of organic bases with chloride of platina, these latter forming double salts usually very insoluble, that such analogy might perhaps extend to their power of forming alums, as they are termed. I submitted solutions of sulphates of several organic bases (quinine, cinchonine, and brucine), in the proportion of their atomic equivalents, in loosely covered beakers, to spontaneous evaporation: after several months, I observed in the vessel containing sulphate of quinine and sulphate of iron, minute octahedral, perfectly regu-



lar, easily recognizable, and colourless crystals, which, on examination, I found to contain quinine and oxide of iron. After rinsing with cold water, they possessed a strongly bitter taste; when heated on platina foil they blackened, indicating an organic substance; and by continuing the heat to ignition, a residue of peroxide of iron was obtained. The quantity of crystals formed was not sufficient for analysis. In the other beakers (cinchona and brucine), the sulphates of organic bases had crystallized apart from the oxide of iron. H. WILL.

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#### ART. IX.—*Ferro-citrate of Quina.*

IN some experiments I had undertaken some months since, certain facts came to my knowledge which are interesting, in reference to the peculiarities of organic bases. Having prepared a solution of peroxide of iron, filtered from a large excess of the base, I added to the very dilute solution pure quina, which was dissolved to an extent which surprised me, giving a very brilliant golden yellow solution. Rapidly evaporated in a capsule of porcelain immersed in a salt-water bath, greenish yellow diaphanous scales were obtained, very adherent to the sides of the vessel, and requiring to be chipped off. Examined under a microscope, there appeared in some portions a slight tendency to assume the crystalized form; but I have not yet procured defined crystals, so as to render my analysis of any value.—(*Communication to the Editors.*)

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### CHYMISTRY APPLIED TO AGRICULTURE.

#### ART. X.—*On the Nourishment of Plants.* By TH. DE SAUSSURE.

[Continued from page 14.]

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##### ABSORPTION OF HUMATE OF POTASSA BY BEANS\*.

THE root of the plant was placed in a test tube of 22 millimetres (= nearly nine-tenths of an inch) interior diameter, and 150 in height (= 6 inches), which contained a dark brown solution of carbonated humate of potassa, or 7 centigr. (= 1 grain) of dry humic salt, containing, according to analysis, 18 milligrammes (= nearly three-tenths of a grain) of humus. Besides the before-mentioned plant, a similar vessel, filled with a solution of the

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\* For the sake of brevity, I term that humate of potass which is a more complex combination, formed by the union of carbonate of potassa with humus, mixed with vegetable matter partially changed, in consequence of the early stage of fermentation. This humic salt was prepared by boiling, for several minutes, sifted mould, procured from Meudon, with half its weight of bicarbonate of potassa, using forty times its weight of water. The solution was then diluted with a quantity of water sufficient to maintain the perfect nourishment of the plant, and was changed according to the age or species.

humic salt, was placed, with a view to observe what change would be effected in it by evaporation and the influence of the atmosphere.

After a fortnight the original weight of the plant (eleven grammes = 170 grains) had increased six grammes (=92 grains). It had absorbed 135 grammes (= about four ounces and a half) of the liquid. The absorbed liquid was replaced every day by distilled water. The white roots of the plant had obtained their full length: no sediment had deposited either on the plant or from the liquid. The latter had evidently lost in colour nearly in the same proportion as if it had been diluted with twice its volume of water. These results are so striking, and so easily obtained, that no doubt can exist in the mind of any one who will be at the pains to repeat the experiment.

The liquid remaining behind, after the growth of the plant, yielded, on evaporation in a water-bath, 2 centigrammes (= 3-10ths of a grain) of humate of potassa, containing 9 milligrammes (nearly 1-10th of a grain) of humus—a quantity which may be about equivalent to that absorbed by the plant.

#### ABSORPTION OF THE HUMATE OF POTASSA BY THE COMMON KNOT-GRASS (*Polygonum persicaria*).

I plunged the roots of a *Polygonum persicaria*, weighing 20 grammes (= 310 grains nearly) into a solution of 430 cubic-centimetres (= 6622 grains—a pint imperial of distilled water is 8·780 grs.) of humate of potassa. This plant, on account of its absorbent properties as a marsh plant, is much more suited for experiments of this kind than a bean plant.

These 430 cubic-centimetres of solution contained 0·73 grammes (a gramme is 15·4 of a troy grain) of dry humate of potassa: the absorbed liquid was not replaced. In the course of ten days the liquid had diminished to 65 cubic-centimetres (= 1003 grs.): its colour was darker than that of the original solution, in consequence of the healthy plants absorbing the water in greater proportion than the substances held dissolved in it.

The plant had increased in weight  $3\frac{1}{2}$  grammes = nearly 54 grains. The dry saline humate which had been absorbed must, according to the weight of the residue, have been 0·352 grammes, containing, according to analysis of the humic salt before and after absorption, as the composition is not invariable, 43 milligrammes (= 662 gr.) of humus.

#### ABSORPTION OF EXTRACT OF MOULD BY *Polygonum persicaria*.

I macerated for two days a certain quantity of heath-mould from Meudon\* in half its weight of rain-water. 100 grammes

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\* The fertile mould of which we speak does not effervesce with acids. Burnt, it leaves behind 0·22 of earthy matter and metallic oxides, combined with several

(= 1543 grs.) of the filtered liquid yielded, on evaporation in a water-bath, a dark-brown neutral extract, which weighed, whilst warm, 0.338 of a gramme—not an invariable result, I would observe. This substance, as is also the case with the greater part of the extractive of mould, did not contain any perfect humus. The aqueous solution deposits, however, on evaporation, a precipitate which is a modification of humus. These extractive matters are, therefore, not to be considered as solutions of humus, but rather as substances capable of producing humus. These extracts, especially the latter, are plentifully imbued with azote.

Twelve centigrammes (nearly two grains) of this extract were then mixed with 100 grammes of water (= 1543 grs.); one half of the filtered solution taken for the nutriment of two plants (pol. pers.); the other was retained in a similar vessel, which did not, however, contain any plant. After the lapse of nine days (during which time the absorbed fluid was replaced by water), the plants, which seemed in a very healthy state, having grown seven centimetres (nearly three inches), and sent forth long white roots, were taken out. The comparing fluid evaporated, yielded a dry extract, weighing 39 milligrammes (= 6006 grs.); whilst that of the liquid left by the plants weighed only 33 milligrammes = 5082 grs.

This experiment was remarkable, first, from the circumstance that the liquid containing the plants partially lost its colour; secondly, from the perfect transparency of this solution compared with the change which the test or comparing liquid had sustained, this latter being altogether turbid; thirdly, for the quantity of water evaporated from the plants. This amounted, at a temperature of nearly 22° C. = 68° F., sometimes to three and a half times the weight of the plant in the space of twenty-four hours.

In some of my experiments on the absorption of organic extracts, the roots suffered, became black, especially at their extremities. By replacing the absorbed liquid with water, the solutions did not lose their colour, and the weight of the extrac-

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salts. Moistened with a little water, in consequence of the partial solubility of organic matter, it enters into fermentation if the air be excluded by a jar over a mercurial bath, and disengages carbonic and acetic acids, which, previous to fermentation, were not contained therein. The first infusion of this extract contained (like most moulds) about one-fourth of deeply coloured grape sugar; besides much dextrin, a substance containing azote, with a deposit of extractive, some traces of nitrate potash, nitrate ammonia, muriate lime, and muriate potash. It left 14½ per cent. of ashes, containing 3 per cent. of salts soluble in water, of which  $\frac{1}{10}$  was carbonate of potassa. It contained phosphate of lime and potassa, and other alkaline salts. That portion of the ashes which was insoluble in water contained chiefly phosphate of lime, metallic oxides, and silica.

[M. Saussure uses a solution of vegetable matter, which is rendered soluble by bicarbonate of potassa, and which he states does not produce a pure humate of potassa at once, although the vegetable matter is capable of being converted into humic acid. Might not the conversion of vegetable matter into humic acid, and subsequent formation of humate of potassa, cause an evolution of carbonic acid, affecting the plant to an extent, which may be mistaken for the beneficial influence of the humic salt?—Ed.]

tive dry residue was sometimes greater than that of the extract previous to absorption.

It appears that these operations are exposed to two different influences ; first, the absorption of the nourishing substance ; and secondly, to the replacement of humus by organic matter yielded by the decomposition of the plants. In case the latter influence prevails, or even when both influences are equal, the quantity of substances consumed in the nutrition of the plants could not be defined. This, I conceive, explains the discrepancy in the results obtained by Mr. Hartig.

Having thus proved the absorption of humus by the roots, it remains for me to refer to the assimilation of the said humus after having entered the plants. One of the proofs of this assimilation is derived from the absence of that peculiar colouring matter of the humus in the interior of those plants which have absorbed a strongly coloured solution of humate of potassa, as compared with the different effects of colouring matters (such as ink, &c.) which are not fitted for the nutrition of plants. The latter leave behind them traces of their passage ; while the former are changed and partly assimilated by plants. A bean-plant of fifteen inches high, whose roots were plunged in a filtered decoction of Brazil-wood acidulated with a little alum, was not able to absorb one-fifth of its weight of this solution, which dyed of a red colour four-fifths of its stalk before it withered ; whilst knotgrass (polyg. pers.) grew very well in the same liquid, absorbed its colouring components, and shewed no trace thereof in the stalk ; but when, on the other hand, a similar plant was immersed in dilute ink, it received a blueish colour from absorption, which, at the same time, caused it to wither. The colouring matter of Brazil-wood underwent a change during its partial assimilation by the knotgrass ; whilst in the bean plant, for which it was unfit nutriment, no decomposition ensued.

[To be continued.]

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ART. XI.—*Essai de Statique Chimique des Etres Organisés.*

Par M. J. DUMAS. 2<sup>ième</sup> édition, augmentée de Documens numériques. 8vo. pp. 88. Paris : Fortin, Masson et C<sup>ie</sup>. 1842.

[Continued from page 15.]

BEFORE proceeding with the continuation of Dumas' summary, we must introduce our readers to the gratification we ourselves have experienced in perusing the following particulars relative to the ancient Ionian school of philosophy.

"The chief of the Ionian school was born, according to Apollodorous, in the first year of the 35th Olympiad, 640 years B. C., at Milesia, in Ionia. Surrounded by nature, he endeavoured to search into the wonders of creation. With every reflecting mind, he inquired—How, and for what

purpose, does every thing which is produced exist?—Whence comes it?—Whither does it depart? It was in one of the most beautiful countries of the globe, on the fertile plains of classic Ionia, full before the sea which separates Asia from Europe, that Thales propounded the questions he sought to resolve. Vast were these inquiries, embracing every science; and, in truth, the very aim and object of all human knowledge."

"Water is the principal of all; it is water that has produced every thing. Plants and animals are only water condensed under different forms; it is to water they will be reduced. Such was Thales' reply."\*

"By substituting air for water, we have the reply of Anaximenes, and other philosophers of the same school.

"Twenty-four centuries now separate us from Thales; and yet what are the eloquent words of one of the most celebrated chymists of modern times:"—

"Plants, animals, man, contain matter. Whence comes it? What part does it enact in their tissues and the liquids which bathe them? or whither does it depart when death breaks the bonds by which its different parts were so closely united?"

"Plants and animals come, then, from the air, and are only that air condensed. They come from the air, and thither return. They are the true dependants on the atmosphere."†

"Far be it from me to adduce by this the insignificant question of priority. There is contained in these remarks something more elevated—the universal and necessary law which presides at the conception of all theories. The ancients, poor indeed as to facts observed, formed theories which astonish us by their boldness; and in modern times, when we are richer in facts, we observe systems raised which, if we may be allowed the phrase, have for their object merely the reproduction of doctrines as old as human kind. We are in this category, then: either these doctrines are eternal truths, inherent to the very intelligence of mankind, or simple phantasms of the mind, always reproduced under the same forms, when man ponders on subjects which thought alone can properly conceive, but which direct experiment never demonstrates. Such is the inextricable dilemma into which we inevitably plunge when our pursuit is the history of science."‡

Having adverted to these striking remarks of Dr. F. Hoefer, we continue further to extract from Dumas:—

"In fact we have ascertained by the result of every kind of evidence, that animals do not create true organic matter, but that they destroy it; whilst plants, on the contrary, habitually create the same matter, and destroy but little thereof, and that only for particular and determinate purposes.

"Thus the grand laboratory of organic life resides in the vegetable kingdom; it is there that vegetable and animal matters are formed, and at the expense of the atmosphere.

"Vegetable matter passes ready formed into herbivorous animals, who destroy a portion, and accumulate the remainder in their tissues.

"Herbivorous animals pass ready formed into carnivorous animals, who destroy or preserve them according to their wants.

"Lastly, during the life of animals, or after death, these organic matters, gradually destroyed, return to the atmosphere whence they were derived."

\* Aristot. *Metaphys.* 1, c. 3. *De Cælo* ii. 13. *Sextus Pyrrh.* iii. sec. 30. *Plutarch de Placit. Philos.* 1, 3. *Stob. Eclog. Phys.* 1, c. 2, edit, Heeræ, p. 291.

† *Essai Statique*, Dumas, 2d Ed. p. 2.

‡ *Histoire de la Chimie*, par le Dr. Ferd. Hoefer, pp. 65.

Thus closes the mysterious circle of organic life on the surface of the globe. The atmosphere contains or engenders the oxidated products, carbonic acid, water, azotic acid, oxide of ammonium. Plants, true apparatus of reduction, separate their radicals, carbon, hydrogen, azote, ammonium. With these radicals they form all the organic or organisable matter which they yield to animals. These, in their turn, true apparatus of combustion, reproduce by their action carbonic acid, water, oxide of ammonium, and azotic acid, which return to the air in order to reproduce anew, through revolving centuries, the same phenomena.

And if to this tableau, already so striking on account of its simplicity and grandeur, we add the undisputed part which is enacted by solar light, the only power capable of setting in motion this immense machinery—machinery unto the present moment inimitable—that the vegetable kingdom constitutes, and is the means whereby is effected the reduction of the oxidated products of the air, we shall be struck with the meaning of these words of Lavoisier:—

“ Organisation, feeling, spontaneous motion, life itself, exist only on the surface of the earth, and in places exposed to light. We may say that the fabled Promethean torch was the expression of a philosophic truth which had not escaped the ancients. Without light, nature was without life; she was dead and inanimate: a beneficent God, in creating light, spread over the earth organisation, feeling, and thought.”

These words are as true as they are beautiful. If sensation and thought—if the most noble faculties of the soul and of intelligence, need a material covering in order to manifest themselves—it must be that plants are charged to weave the woof of such covering with the elements which they borrow from the air, and under the influence of that light which the sun, its inextinguishable source, pours constantly and in torrents on the surface of the globe.

The learned chymist has divided his work into five divisions, of which we have attempted to convey the theory he develops, as contained in the first; the second is devoted to an explanation of the composition of water, carbonic acid, and the atmosphere; the third is devoted to a consideration of the components of the preceding, carbon, hydrogen, and azote; the fourth relates to the proximate components of plants, as formed from the preceding elements by the action of light and heat; whilst the fifth treats of animal life, derived, as he had previously demonstrated, from the vegetables whose components had been considered in the fourth section. The work concludes with a series of most valuable documents, of the highest importance to the chymist and agriculturist, being numerous analyses in verification of the theory, which Dumas, Liebig, and Boussingault, are stamping current in the scientific world by their searching investigations and luminous inductive reasoning.

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ART. XII.—*Is Selenium a true Element? and Theoretical Reasons for considering Selenium an Oxide.* By SEPTIMUS PIESSE. Hastings, Carey-street. London: 8vo. pp. 16.

THE author of the paper we are about to notice is a practical chymist, who has been engaged in Sulphuric Acid Works, whereby his attention has been directed to every matter, practically or theoretically connected with his vocation, and the seven pages in which he treats the inquiry announced on the

cover of his *brochure*, contain rather a challenge to other chymists, with a view to the discussion of isomorphism and classification of elements, than the expression of the firm belief of the writer in the views he advocates, or a forcible exposition of argument for their support. The summary of the author's reasons for considering selenium as an oxide are:—

1st, That between isomorphous substances a relation exists in their equivalents, which, when *accurately* determined, are always a multiple of each other or have the same atomic weight. Isomorphism can always be traced in some of their compounds where the equivalents have a direct proportion.

2d, Selenium being isomorphous with the substances with which it is grouped, but having an atomic weight incompatible (*with the author's views*) in reference to the classification of elements, is the reason its equivalent is stated to be wrong.

3d, It is my opinion that the whole of their elements want their atomic weights revising; but it would be useless, if some more efficient mode of taking them is not proposed, &c. &c.

The gist of the writer's arguments, for they have been very hastily expressed by himself, is simply this—that unless a relation exists in isomorphous substances, which relation is that their equivalents are multiples of each other, or have the same atomic weight, then such equivalents are inaccurate, and it is for this reason only that selenium is presumed to be an oxide. To arrive at such hasty conclusions, we think the reverse of progress in science. Instead of cutting through difficulties to lay down an hypothesis, we prefer a narrative of experiments, with which we are happy indeed to recognize a coincidence of generalized views, but we cannot express any very high opinion of the practice to which much of the contempt with which scientific chymistry is regarded by mercantile men may be attributed, and which practice is, that of forming hypotheses, and then searching for such facts only as tend to support them, whilst those, however well ascertained, that militate against such views, are wilfully omitted. Mr. Piesse, however, does not act precisely thus; he certainly measures his theoretical views against the experiments of Berzelius, which latter, had he perused in detail, he would not have feebly praised as noted for their accuracy merely. To return, however: whilst seleniuretted hydrogen and the compounds of selenium with oxygen develop their constituents so plainly under the tests to which they have been hitherto submitted, we must regard any hypothesis, unsupported by actual experiment, which is irreconcilable with their composition so deduced, as irreconcilable with truth. We rise, then, from a perusal of Mr. Piesse's pamphlet, with the impression that he has furnished no solid argument against selenium being considered as a simple element, but that the theoretical views of the classification of elements entertained by him are, by his own details, inconsistent with well-ascertained facts.

## PRACTICAL PHARMACY.

ART. XIII.—*On the Preparation of Ung. Hydrarg. Nitrat.*

*To the Editor of the Annals of Chymistry and Pharmacy.*

SIR,—In reply to your communication for practical remarks, and hailing with much gladness the appearance of a journal which is to put us in possession of the researches of our brethren on the Continent, I beg to hand you the few following observations which have occurred to me in the preparation of this so easily made ointment, when the rationale of its preparation is understood.

Being of opinion that we are bound to the formulæ of the Pharmacopœia, perhaps the following remarks may assist in rendering the preparation of this ointment less uncertain. In order to be as explicit as possible, I shall separate, under three heads, the precautions to be observed.

1st. The nitric acid must be of the requisite strength, sp. gr. 1.5, or should contain 79.7 per cent. of real acid; if weaker, an increased quantity must be employed, calculating such increase according to Dr. Ure's valuable Table.

2nd. The quicksilver must be pure, since mercury, bismuth, zinc, and tin, have very different relative atomic weights, and consequently require very different relative quantities of nitric acid to oxidate them; as the following Table, extracted from the 9th volume of Berzelius' *Lehrbuch der Chemie*, will show:—

|                       | Atomic Weight. | Metal and Oxygen in Parts. |       |     |
|-----------------------|----------------|----------------------------|-------|-----|
| Peroxide Mercury .    | 109.45         | 92.68                      | 7.32  | 100 |
| Sesquioxide Bismuth . | 166.18         | 85.53                      | 14.47 | 100 |
| Oxide Zinc . . .      | 40.32          | 80.13                      | 19.87 | 100 |
| Peroxide Tin . . .    | 74.95          | 78.62                      | 21.38 | 100 |

The above Tables represent the atomic weights of the several oxides, and a glance shows how much more oxygen is required by each of the metals with which quicksilver is adulterated, than by the quicksilver itself, and consequently how much more acid is required when such adulterated metal is used for the ointment.

In proportion as the acid is exhausted during the oxidation of the metal, so will it be less capable of oxidating the fatty matters when mixed therewith: and as such fatty matters possess an almost deoxidating power, perhaps from their great attraction for oxygen, as shewn by their tendency to become rancid, if there be a deficiency of acid they will absorb oxygen from the peroxide formed in the first instance, causing first the ointment to assume the consistence of a plaster, and eventually



reduce at least a portion of the mercury to a minutely divided state, described by Mr. J. Bell in his paper on the division of mercury, or to the state of protoxide.—(See *Pharmaceutical Transactions*, p. 194.) If, however, the operator employs acid of due sp. gravity, 1.50, and pure quicksilver, he will then have a solution of nitrate of peroxide of mercury, with free acid, perfectly capable of decomposing the lard and olive oil, to which it is about to be added, into elaidate of glycerine, provided a due temperature be attained; which brings me to the third precaution to be observed.

3rd. The degree I have always observed is from 180° to 200° (the heat attained in a wedgewood pan over a water bath), and I have thereby succeeded in making a butyraceous ointment in small, equally well as in large quantity, which has maintained its colour and consistence for four years. I hope to be able to forward a sample for inspection, having about five years since made some for a wholesale firm, who had frequently been disappointed in their results, and a portion of which, I believe, has been preserved. The changes that take place by the addition of nitric acid to oily matters having been referred to in Mr. Kemp's article, page 214 of the *Pharmaceutical Transactions*, where he quotes the results of Boudet's researches, I wish to add, that a very excellent account of this compound will be found in Dr. Pereira's "*Materia Medica and Therapeutics*," vol. i., 2d edition, page 768. I believe I may lay claim to having first observed the effects of adulterated quicksilver on the oxidating powers of the acid.

DIE GELBE HAND.

London, Oct. 3, 1842.

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ART. XIV.—*On certain Articles in the Russian Trade.* By  
DR. F. GOEBEL.

[Continued from page 21.]

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2. PERSIAN SAFFRON.

PERSIAN saffron is a product of the neighbourhood of Baku and Schiran, a town in the south-east of Baku, where it is obtained in considerable quantity, sometimes amounting to 100,000 lbs. and upwards annually. It is scantily brought into Russia via Astrachan, and is not exported thence. The Persians themselves consume the greatest quantity, as a seasoning to many of their dishes, and export a part to India. It is usually in round flat cakes, of from nine to twelve inches in diameter, and one-half to three-fourths of an inch in thickness. These cakes are in most instances somewhat moist and glutinous; they may, however, be completely dried, and are then easily pulverized. The filamentous petals are much larger than those of the European saffron, and they are at the same time darker and less im-

bued with flavour and colouring matter. The heads of the flower or petals are, immediately after the harvest, formed into cakes and compressed, in order to gain a quantity of extractive juice, valuable for its colouring matter.

### 3. WORMSEED.

Wormseeds, the little flower-buds of *Artemisia Vahlia*na, form a considerable part of the exports of Russia, especially the largest and best species, generally called, in Germany, *Semen Cinae levanticum*, or *Semen Cinae in granis*. It is collected in the N. E. part of Persia, into bags of felt capable of containing about 300 pounds each, which are brought by caravans conducted by Bucharians through the steppes of the Kirgese to Troitzq and Orenburgh.

Wormseed brought, at public sale, a few weeks since, 40s. per cwt.

It is mostly adulterated with dust and sand, from which the druggists of St. Petersburg separate it by means of winnowing apparatus made for that purpose. They also clear the little flower buds from the stalks and other particles which have fallen off from the grains, after which they term it *Semen Cinae in granis*.

In the steppes of the Kirgese and Kalmucks, many *Artemisiae* are found, serving as nourishment to the herds of these nomadian tribes. *Artemisia pauciflora* (Stechmann), or *Artemisia alba* (Pallas), are frequently found in the steppes situate between the rivers Volga and Ural. Their little flower buds are rather round than oblong, smaller than the Persian, smother and less felty than those from Africa. I have not been able to ascertain if they are collected for any purpose by the tribes of Kirgese and Kalmucks; they do not, however, appear to be cognisant of their value, and indeed seem too idle to be at the trouble of collecting them; but at Astrakan, Sarepta, Saratow, and other towns bordering on the Volga, they are neglected.

### 4. OILS OF ANISEED AND CUMIN.

In some provinces of the south of Russia, for instance in the district of Orel, aniseeds form a considerable part of the produce of the soil; and there the oil is also procured by distillation. Of this oil no less than 4000 lbs. are exported annually. Aniseeds, however, seldom or never become an object of exportation. Transported by land to St. Petersburg, they are much dearer; at the same time, the seeds, being smaller than those of the anise cultivated in Thuringia, are less sought after.

Oil of cumin forms also an article of exportation, but in smaller quantities than that of aniseed. The seeds of cumin are seldom exported.

## 5. CASTOR.

Two species of castor are usually recognized, and distinguished in trade—the Russian or Siberian, and the English or Canadian.

The Russian castor has become at the present time exceedingly rare. It is still exported from Siberia, but in very small quantity; and from Poland, now and then, some Polish Jews bring a few bags to Moscow: and this is the reason why (at the present time) a pound of castor is worth 320 Rubl. S.M. (=£51. 7s. 8d.) and some time since it reached higher prices. Bucharian castor is brought to the market of Nischnei Novgorod, and, if in good condition for penetrating odour and other qualities, does not yield to the Siberian, and at the same time is cheaper. The bags in which it is contained are larger, have a thicker skin, and are also provided with the attached fat bags. There are bags weighing from twelve to eighteen ounces. The Bucharian bags are not smoked, but have been externally salted, sometimes to such degree that the salt partially covers the surface when offered for sale; these are therefore of a lighter colour than the Siberian, which are always dried in smoke, and thereby receive a blackish colour. The Siberian castor bags are small, of a pear-like form, have a thin skin, are always separated from the fat bags, and have been smoke-dried.

## 6. GALBANUM PERSICUM. (BUCHNER).

It is remarkable, with so ancient a medicament as galbanum, which was known both to Hippocrates and Dioscorides, and designated by the name of *χαλβάνη*, that, up to the present time, although its use for medical purposes has never been discontinued, yet it is not exactly known whence it is obtained. Dioscorides supposed that it was the product of a *ferula* growing in Syria, which, according to Lobel, is called *ferula galbanifera*. He cultivated this plant from the seed often found in the gum resin of galbanum. Botanists and pharmacologists travelling in Asia were, however, unable to find there any such *ferula* as that which had been described. The greatest quantity of galbanum is said to come from Africa, especially from Ethiopia to Trieste and Marseilles; but the opinion that the galbanum of Arabia, Syria, and the East Indies, is also an object of trade, is unshaken up to the present time,

This alone may be considered as ascertained—that galbanum is the milky sap of a tall umbelliferous plant, but of what genus and species, opinions and statements do not render conclusive. Seeds (buds) are frequently found among the galbanum in massis. Several botanists have cultivated them, and produced different Umbelliferae. Breyn termed this plant *Oreoselinum anisoides*: according to Linnæus it is called *Bubon galbanum*: Don, however, found that the umbelliferous plant raised in our gardens

did not possess the odour and taste of galbanum: according to Curt Sprengel the name of the plant is *Selinum galbanum*. That fruit which Don found in galbanum appertains to the genus *Siler*, or rather to another genus nearly related to it, which he designated by the officinal term of "galbanum;" the officinal species is therefore to be termed *Galbanum officinale*. He thinks that a distant and inaccessible part of Syria is the native soil of this plant: according to Royle's opinion, it is, however, found also in northern Persia and Arabia.

The exclusive origin of galbanum is, however, not so decided as some pharmacologists presume; for Lindley observes, in a treatise in the Botanical Register for the year 1839 (Aug. p. 64), that from the seeds, or rather buds, which are found mixed with gum resins, no certain conclusion can be formed as to whether they be those of the plant from which the gum resin itself may have been gathered, and that Sir John M'Niell brought home from Persia branches of an umbelliferous plant, to which drops of a gum resin were yet adhering, and which had all the properties of genuine galbanum; at least it neither resembled *asafoetida*, *gum ammoniacum*, nor *sagapenum*. The fruits of this plant were nowise similar to those of the plant which Don termed *Galbanum officinale*; nor were they of any plant belonging to the genus *Opopanax* and *Ferula*: they approached more to the genus *Smyrnum*, without, however, being exactly the same. Lindley assumed from these reasons an opinion that these fruits were the product of a new plant, which he described and termed *opodia*, and the species of which received on examination the name of *Opodia galbanifera*: it had pretty nearly the exterior character of *Pastinaca opopanus*. This *opodia*, into whose botanical character we do not purpose entering here, grows, according to M'Niell, in Persia, in the neighbourhood of Durrood, in the province of Khorassan.

After all this, it is very probable, as Martius observes, in his excellent *Pharmacognosy*, p. 379, that the three chief species—viz. 1, *Galbanum in granis* s. in *lacrymis*; 2, in *massis*; and 3, *Galbanum persicum*,—are obtained from different plants; so that Don and Lindley may both be right. One of the two former species, which we receive by Trieste and Marseilles, and which is universally known and used, may be obtained from *Galbanum officinale*, and the Persian species from *Opodia galbanifera*. As the latter is less known in Germany, the following information and description, which has been communicated by Herr Inspector Ludewig, of St. Petersburg, in the *Nordische Centralblatt für die Pharm.* 1840, No. 24, is peculiarly interesting to the reader.

The Persian galbanum is brought by Astrachan and Orenburg into Russia, and from thence to the other parts of Europe. It

differs in its qualities so much from the two other kinds, that the supposition of a mother-plant, different from them, is perfectly justifiable. It is forwarded in large lumps, covered with hides, or mats; its colour brownish-red with white stripes, and of so soft a consistence, that, exposed to the air, it will liquefy at a gentle temperature. It is full of impurities especially fragments of stalks. The odour is penetrating, almost similar to that of assafoetida, and differing entirely from that of the other species. The taste is disagreeably bitter.

According to Martius, 16 ounces of Persian galbanum yielded 6 drams of ethereal oil; that is, therefore, 46 parts in 1000. This product agrees exactly with the result obtained by Caspar Neumann\*, who, it appears from his description, examined the common galbanum in massis. Meissner†, on the other hand, obtained from galbanum in granis, and also a species which he had obtained in whitish-yellow grains, with but few impurities, only 34 parts of ethereal oil in 1000.

Teddichow also examined a species of galbanum, of which, however, he did not give an accurate description, and obtained 57 of ethereal oil from 1000 parts. This result leads us to suppose that he also employed the common galbanum in massis, as did Pelletier, who obtained even 63 of ethereal oil from 1000 parts.

We give, in the following table, the result of these experiments :—

| 1000 Parts yielded     | I.<br>Galbanum<br>in granis. | II.<br>Galbanum in massis. |            |            |  |
|------------------------|------------------------------|----------------------------|------------|------------|--|
|                        | Meissner.                    | Neumann.                   | Pelletier. | Tiddechow. |  |
| Ethereal Oil . . . . . | 34                           | 47                         | 63         | 57         |  |
| Resin . . . . .        | 658                          | 594                        | 668        | 673        |  |
| Gum . . . . .          | 226                          | 187                        | 192        | 236        |  |
| Bassorin . . . . .     | 18                           | —                          | —          | —          |  |
| Impurities . . . . .   | 28                           | 125                        | 75         | 48         |  |

Meissner observed that the whitish-yellow grains contained in the galbanum in granis are simply gum.

It is a great fault of our pharmacologists that they are always disposed to judge of drugs according to appearances; that is to say, by the outward appearances which they present, rather than their efficacy. This fault arises from a want of closer investigation. In the case of galbanum, there is not the least doubt that the degree of its efficacy depends, in the same manner as in assafoetida, on the quantity of ethereal oil it contains, and, therefore,

\* Chemistry, vol. ii. p. 427.

† Trommsdorff's New Journal, vol. i. art. 1, p. 3 f.; Berliner Jahrb. 17, Jahrg. p. 220.

precisely that quality which is now of the highest price is the least effective, and, consequently, the worst; that, further, the Persian galbanum seems to be of the kind which is the most effective; and that the impurities in the galbanum in massis are completely outweighed by the greater quantity of ethereal oil it contains.—BUCHNER, Sen.

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ART. XV.—*French Trade in Senegal Gum.*

THE grant of the exclusive monopoly of the gum trade to a single company, continued, according to the Paris correspondent of the *Times*, to be strenuously attacked by the liberal journals, and but feebly defended by some of the ministerial organs. The several Chambers of Commerce of Havre, Bourdeaux, and Marseilles, had unanimously protested against its institution, and forwarded to the Ministry strong remonstrances on the subject. M. Regis, of the firm of Victoire Louis Regis, also denounces, in a letter addressed to the *Courrier Français*, the ruinous consequences likely to result from the concession of what he terms a monstrous privilege, and which he says must ultimately place the trade in the hands of the English. The company, he maintains, realized this year a profit of 345 per cent., having required of the Moors 60 lbs. of gum, or 44f. 85c. for the piece of Guinea, which only costs 12f. 85c., or 13f. each. The consequence was, that only 2,000,000 lbs. of gum were obtained, instead of 8,000,000 lbs., and that merely 40,000 pieces of Guinea were disposed of, instead of 120,000 to 140,000. M. Regis is of opinion that the Moors will not long submit to these exactions, and that next year the greater part of the trade will be forestalled by the English.

We believe the Senegal gum is chiefly used in manufactures, for giving a beautiful finish to silk goods.

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ART. XVI.—*Proposals for remedying the Scarcity of Leeches.*

By Dr. WAGNER.

(From the Allgemeine Anzeiger der Deutschen.)

PAINFUL experience has taught physicians, that the scarcity of leeches, (*hirudines medicinales*), and consequent high price, almost prohibit their employment, as a curative means, for the lower classes; wherefore, of late years, their use has been confined almost entirely to the wealthy. If thirty leeches be required, and such a number is far from unusual, an outlay of from twelve shillings and sixpence to fifteen shillings is incurred. How few

of the middling classes can afford this sum ; and with their poorer neighbours it is impossible to do so, even if death be the consequence.

Such has been the result of Dr. Wagner's experience ; and he has applied his mind to the remedying of such scarcity. He proceeds :—

“ I applied to a charitable miller in the neighbourhood, who agreed to contrive in his garden two water tanks, of moderate size, and arranged so that, in one of these, leeches which had been applied at least once during the year were kept, this being necessary to render them fit for propagation ; while the other was destined to contain those which were intended for medical purposes during the ensuing year. From this time leeches were only disposed of on hire, the terms being about twopence each time ; with the express condition, that they were to be returned immediately after application : consequently, after being thus rendered fit for propagation, they were placed in the breeding tank. Here they remained for a year or so without being disturbed, when they were removed to the second tank fit for medical uses ; after which a similar course was again pursued towards them. Oftentimes indigent persons, or friends of the owner, were furnished with them ; but their return after use was an invariable condition.

“ At the commencement of the winter, a sufficient number was taken out for the cold season. These were placed in jars, so as to have them always ready ; because it had been ascertained, that, late in the autumn, on the approach of winter, leeches descend into the mud at the bottom of the tank, whence it is not easy to obtain them. Those which have been applied during the winter are returned to their fellows in the breeding tank, or they may be kept in jars until the ice is gone.

“ In this way the supply of old breeding leeches is kept up, and young recruits are never required ; so that during the greatest dearth of leeches I have never been embarrassed, but could always supply the wants of my poorer patients with this indispensable curative. The leeches were so healthy and vigorous in consequence, that I never had to resort to artificial means to induce them to suck ; while the weakly and expensive leeches now supplied to the druggist require sometimes either to be stimulated by immersion in porter, or tempted by a drop of blood, milk, &c. in order to induce them to fulfil the intentions required.”

[To be continued.]

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## FOREIGN CORRESPONDENCE.

ART. XVII.—*Scientific Meeting at Mayence.*

THE following is a short account of the opening of the twentieth Association of Philosophers and Men of Science, which took place at Mayence on the 19th of last month. About 600 philosophers from Germany and the neighbouring states were present; even Russia sent her representatives. This learned assembly occupied the spacious and magnificent hall in the Castle, formerly the residence of the Elector (kurfuers). The opening speech of the president, Dr. Groeser, of Mayence, was received with great applause. The learned speaker commenced by expressing the thanks and pleasure which the inhabitants of Mayence felt from the circumstance of such a re-union taking place within the walls of their town; he then spoke of the nature and aim of the association; and, in conclusion, gave some interesting particulars on the former and present spirit of scientific research at Mayence, which, he said, had the high honour of being under the gracious protection of the Grand Duke of Hesse Darmstadt.

The Chargé-d'Affaires, Notary Bruch of Mayence, next addressed the meeting. He began by touching upon the constitution of the Philosophical Society of that place, and proceeded then to the subject of alteration in their statutes, which, during the last meeting held at Brunswick, had been much urged. A committee has been formed for this purpose, consisting of Professors and Drs. Martius, of Munich; Taeger, of Stuttgart; Mansfield, of Brunswick; Cretschmar, of Frankfort; Leukhard, of Freiberg; Gmelin, of Heidelberg; Noeggerath, of Bonn; and D'Ooterpout, of Wurzburg. Pastor Brehm, the eminent zoologist, then spoke on many phenomena in the animal tribe, indicating their intelligence; Dr. Stoebel, of Frankfort, on a newly discovered infusory animalcule; Professor Kastner, of Erlangen, on the theory of light, in reference to its chymical and physical nature. Besides this, several very flattering epistolary communications, highly important in a scientific point of view, were communicated to the meeting; after which the members present proceeded to the magnificently decorated banquet hall, where about 1000 persons were assembled to partake of the feast which had been provided. Then did philosophy and science bow to the soul-inspiring rule of conviviality and good cheer. But few, however, of the toasts could be heard in such an immense hall.—*From a Correspondent.*

ART. XVIII.—*Effects of Arsenic on Animals.*

To the Editor of the *Annals of Chymistry.*

SIR,—Seeing in your publication a paragraph on the subject of giving arsenic in large doses to sheep, I am induced to send you the following particulars with regard to three unsuccessful attempts to poison a



dog by means of the arsenious acid of the shops, and which, in some measure, tends to corroborate the facts mentioned in your journal.

The dog was a small animal, usually frequenting the parlour, and had become old and afflicted with the mange, besides being disagreeable in other respects, and consequently the owner wished to have it destroyed. The first dose I put in paper myself, and gave directions for it to be administered in such a way that the whole of it should be taken (weighing more than two drachms), every particle of which was swallowed, and in about half an hour violent purging and vomiting took place, but leaving behind no unpleasant effects: on the contrary, the dog exhibited a greater degree of sprightliness and vivacity than it had done for months before. In the course of a few days another dose was administered, of an increased strength; but the same effects of purging, with not quite so much vomiting, were produced. The third dose was smaller (about half a drachm in weight), and which also had the effect of the two former, though in a much more moderate degree; the whole tending to the establishment of the life and health of the dog. About a drachm of the medicinal hydrocyanic acid was some time after made use of, which quickly destroyed life. It would seem by the foregoing particulars, that the poisonous properties of arsenic, with regard to its action on the animal frame, is greater when given in small quantities than when larger doses are applied. I only regret that a dose of about ten grains had not been given to the animal.—I remain, sir,

Your obedient servant,

A SUBSCRIBER.

11, George Street, Bath, Oct. 3, 1842.

## ALPHABETICAL TABLE OF ATOMIC WEIGHTS.

ART. XIX.—*On the mode of Expressing the Composition of Bodies by Formulae, with Reference to their Elements and the Number of their Atoms.*

ALTHOUGH, says Professor Berzelius, in the fifth volume of his Treatise on Chymistry, I have in the preceding pages made use of chymical signs, and appear to have supposed the readers to have been acquainted with them, I will here explain the whole doctrine of symbols, in order to place them in their true scientific point of view.

We choose for these symbols the initials of the Latin names of the bodies they are intended to represent. In the event of the names of several bodies beginning with the same letter, we add thereto the first succeeding letter which they do not possess in common. Thus, for instance, we take C=carbon, Cl=chlorine, Cr=chromium, Cu=copper, Co=cobalt. To the metalloids no

letter is added; not even if their names begin with the same letter as those of other metals. Chlorine, bromine, and silicon, however, form an exception, because their names begin with the same letters as carbon, boron, and sulphur.

The number of atoms is denoted by a cypher. A figure on the left multiplies all the atoms which are placed on the right hand of it so far as the next + sign, or to the end of the formula. A small figure placed above on the right hand, like an algebraic exponent, multiplies only the atom immediately to the left thereof, if there be any. For instance,  $S^1 O^3$  signifies one atom of sulphurous acid, but  $2 S^1 O^3$  signifies two atoms of the same acid.

In all cases where two atoms of a radical are united with 1, 3, or 5 atoms of oxygen—as, for example, in the sulphur above mentioned—the perspicuity of the formula is much improved if we have some peculiar sign for double atoms. It would certainly be most natural to double the initials; but in such a way as to form *one compound sign*, and not *two*. In order to express these formulæ in writing, I have, however, found it much easier, and quite as perspicuous, to employ the sign, \* below the line to signify *two* atoms. For example,  $P$  signifies a simple, and  $P_2$  a double atom of phosphorus;  $As$  a simple, and  $As_2$  a double atom of arsenic.

If compound atoms of the first class are to be expressed, this may be done in the following manner:— $Cu O + SO^3$  = sulphate of peroxide of copper, and  $Fe O^2 3 SO^3$  signifies sulphate of peroxide of iron. If, however, the composition of a double salt, that is to say, of a compound atom of the second class, is to be given, the formula, if expressed in the same manner, would be long and obscure; and as the atoms of the second class are in general usually oxysalts or sulphosalts, the number of atoms of oxygen can easily be signified by placing as many points above the radical, and the number of atoms of sulphur by commas, if this latter mode should prove more convenient in certain instances. Sulphate of oxide of copper, for example, may be expressed by  $Cu \ddot{S}$ , sulphate of peroxide of iron by  $Fe, \ddot{S}^3$ , alum by  $K \ddot{S}^3 + \ddot{Al}, \ddot{S}^3 + H^1$ . In the same manner,  $\dot{K}$  may signify sulphuret potassium, and  $\dot{K} \ddot{Mo}$  sulphomolyduret potassium.

For the sake of harmony, analogous symbols might be employed for all signs representative of bases, and we might express

\* [Berzelius employs a line or bar through the letter; but, as no type-founder in England possesses matrices for such signs, we have been unwillingly compelled to substitute a cypher below the line, which indicates, with equal clearness, although, perhaps, not so graphically, as a line through the initial letter, what is signified—ED.]

selenium by —, and tellurium by †, as in the following example:—

|   |    |   |   |   |   |                                |
|---|----|---|---|---|---|--------------------------------|
| K | Mo | . | . | . | . | Oximolybdate of Potasa.        |
| K | Mo | . | . | . | . | Sulphomolybdate of Potassium.  |
| K | Mo | . | . | . | . | Selenimolybdate of Potassium.  |
| † | Mo | . | . | . | . | Tellurimolybdate of Potassium. |

I am in the habit of placing the electro-positive element at the commencement, and the electro-negative element at the termination of these formulæ.

The following are the symbols of the different simple bodies:—

|    |                |    |                       |
|----|----------------|----|-----------------------|
| O  | oxygen         | V  | vanadium              |
| H  | hydrogen       | Mo | molybdenum            |
| N  | nitrogen       | W  | tungsten (wolfram)    |
| S  | sulphur        | Sb | antimony (stibium)    |
| P  | phosphorus     | Ta | tantalum              |
| Cl | chlorine       | Ti | titanium              |
| Br | bromine        | Os | osmium                |
| I  | iodine         | Au | gold (aurum)          |
| F  | fluorine       | Ir | iridium               |
| C  | carbon         | R  | rhodium               |
| B  | boron          | Pt | platinum              |
| Si | silicon        | Pd | palladium             |
| Se | selenium       | Hg | mercury (hydrargyrum) |
| Te | tellurium      | Ag | silver (argentum)     |
| As | arsenic        | Cu | copper                |
| Cr | chromium       | U  | uranium               |
| Bi | bismuth        | Zr | zirconium             |
| Sn | tin (stannum)  | Th | thorium               |
| Pb | lead (plumbum) | Y  | yttrium               |
| Cd | cadmium        | G  | beryllium (glycium)   |
| Zn | zinc           | Mg | magnesium             |
| Co | cobalt         | Ca | calcium               |
| Ni | nickel         | Sr | strontium             |
| Fe | iron (ferrum)  | Ba | barium                |
| Mn | manganese      | Li | lithium               |
| Ce | cerium         | Na | sodium (natrium)      |
| Al | aluminium      | K  | potassium (kalium).   |

These initials have been chosen from the Latin nomenclature, because that language is recognised by natural philosophers of all countries, and is accessible to all without requiring to be changed to suit the idioms of different languages. It cannot be disputed that this is an essential advantage, and most of those who have used it acknowledge the same. A French author\* has had the national vanity to substitute for these initials others taken from the French language. Should the English, German, and Italian writers pursue a similar course, much of the dis-

\* Boudant, Essai d'un cours élémentaire et général des Sciences Physiques. Minéralogie.

tinctness and comprehensibility of these formulæ would be lost, without yielding the least advantage: it is, however, to be expected, from the enlightened views of the majority of true philosophers, that they will not sacrifice the advantages enumerated to such childish vanity. "Science," as Sir Humphry Davy so justly observed, in his speech delivered at the presentation of the Copley Medal to M. Arago, on account of his discovery of the magnetic state of copper during rotation, "science, like that nature to which it belongs, is neither limited by time nor space; it belongs to the world, and is of no country and of no age."

\* I may be permitted, the author continues, to reply here to some objections which have been made against the use of these formulæ for denoting the atomic constitution of bodies. It has been said that they are obscure, fallacious, and without aim. They are obscure only to him who does not for the moment understand their meaning; for those who will be at the pains to examine, nothing is easier than to understand them. Fallacious, however, they can never be, as they only express with simplicity in what manner the compound is constituted according to the ideas of the person who has constructed the formula. If this idea be incorrect and delusive, it will still be so, in whatever way it may be expressed: the formula has no part in the error. It has also been said that these formulæ make an unpleasant impression on the mathematician, as the number placed above the line to the right hand has a higher value in algebra, under the name of exponent, than is given to it in this system; and, farther, that we ought not to intrude on mathematical ground. Such an objection, however, is not entitled to any consideration. A further objection is, that the letter P is read as R in the Greek and Russian languages. One may as easily be mistaken in the language of which a work is composed as to understand in chymistry a chymical formula for an algebraic one. The rules of the latter are in no way necessary to be observed in the former; and they possess merely this in common with each other, that they consist of letters and numbers. With respect, however, to the objection of being without aim, I will give the reader, in the following example, a

conception of the expressive and graphic power these formulæ possess.  $\overset{\cdot\cdot}{K} \overset{\cdot\cdot}{S} + \overset{\cdot\cdot}{Al}_3 \overset{\cdot\cdot}{S}_3 + 24 \overset{\cdot\cdot}{H}_2$  is, as we have previously had occasion to observe, the formula expressing the constitution of alum. It shows that in this compound are united one atom of potassium, 2 atoms of aluminum, and 4 atoms of sulphur, with 48 atoms of hydrogen and 40 atoms oxygen; that one atom of potassa, with one atom of alumina, are united to 4 atoms of sulphuric acid and 24 atoms of water; or that one atom of sulphate of potassa is united to one atom of sulphate of alumina, and that both salts are neutral, i. e., at that degree of saturation in which the acid contains thrice as much oxygen as the base; that the oxygen of the alumina is three times as much as that of the potassa; that the oxygen of the sulphuric acid is twelve times as much as that of the potassa, and four times as much as that of the alumina; that the oxygen of the water is four and twenty times as much as that of the potassa, eight times as much as that of the alumina, and twice as much as that of the sulphuric acid. It may indeed be said that several of these statements are direct consequences of each other. This they certainly are, to those who are acquainted with them; but to such the word alum contains the same meaning as the whole formula which is used for the purpose of communicating to another with accuracy and facility an insight into that which he desires to comprehend. Besides this, combinations are met with in chymical researches, for which either no name is applicable, or which for the moment can only be denoted by a lengthy periphrase, but which may be denoted by a formula describing their several components with the most perfect accuracy. I will cite, as one example only, the several combinations of sulphur in the sulphuretted alkaline metals, for which the German language has hitherto afforded no accurate nomenclature; they may, however, now be expressed with great facility by the formulæ  $K S K S^2 K S^3$  &c., until suitable names be appropriated to them.

| NOMINA.                          | FORMULÆ.                                                                                                                            |
|----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|
| <i>Acetas</i> Stannosus. . . . . | $\frac{1}{4}$ . . . . .<br>$\text{Sn } \bar{A}$ . . . . .                                                                           |
| — Stibicus. . . . .              | $\text{Sb}_3 \bar{A}^3$ . . . . .                                                                                                   |
| — Stronticus. . . . .            | $\frac{1}{2}$ . . . . .<br>$\text{Sr } \bar{A}$ . . . . .                                                                           |
| — Telluricus. . . . .            | $\text{Te } \bar{A}^2$ . . . . .                                                                                                    |
| — Thoricus. . . . .              | $\frac{1}{4}$ . . . . .<br>$\text{Th } \bar{A}$ . . . . .                                                                           |
| — Uranicus. . . . .              | $\text{U}_3 \bar{A}^3$ . . . . .                                                                                                    |
| — Uranosus. . . . .              | $\frac{1}{2}$ . . . . .<br>$\text{U } \bar{A}$ . . . . .                                                                            |
| — Vanadicus. . . . .             | $\text{V } \bar{A}^3$ . . . . .                                                                                                     |
| — Yttricus. . . . .              | $\frac{1}{4}$ . . . . .<br>$\text{Y } \bar{A}$ . . . . .                                                                            |
| — Zincicus. . . . .              | $\text{Zn } \bar{A}$ . . . . .                                                                                                      |
| — Zirconicus. . . . .            | $\text{Zr}_3 \bar{A}^3$ . . . . .                                                                                                   |
| <i>Acidum</i> Aceticum. . . . .  | $\frac{1}{2}$ . . . . .<br>$\bar{A} = \text{H}^6 \text{ C}^4 \text{ O}^3$ . . . . .                                                 |
| — Arsenicicum. . . . .           | $\bar{A}^2$ . . . . .<br>$\bar{A}^3$ . . . . .<br>$\text{As}_2$ . . . . .<br>$\text{As}_2^2$ . . . . .<br>$\text{As}_2^3$ . . . . . |
| — Arsenicosum. . . . .           | $\text{As}^2$ . . . . .<br>$\text{As}_2^2$ . . . . .<br>$\text{As}_2^3$ . . . . .                                                   |

| PONDERA ATOMUROM. |                     | PARTES CENTESIMALES. |         |                        |
|-------------------|---------------------|----------------------|---------|------------------------|
| O = 100.          | H <sub>a</sub> = 1. | + E.                 | — E.    | H vel H <sub>a</sub> . |
| 1110,84           | 89,01               |                      |         |                        |
| 1478,48           | 118,47              | 56,50                | 43,50   |                        |
| 3842,47           | 307,90              | 49,78                | 50,22   |                        |
| 1280,82           | 102,63              |                      |         |                        |
| 1290,47           | 103,41              | 50,16                | 49,84   |                        |
| 2288,14           | 183,35              | 43,78                | 56,22   |                        |
| 1144,07           | 91,68               |                      |         |                        |
| 1488,09           | 119,24              | 56,78                | 43,22   |                        |
| 7652,28           | 613,18              | 74,78                | 25,22   |                        |
| 2550,76           | 204,39              |                      |         |                        |
| 3454,55           | 276,82              | 81,38                | 18,62   |                        |
| 2343,27           | 187,77              | 45,10                | 54,90   |                        |
| 1171,63           | 93,88               |                      |         |                        |
| 1145,70           | 91,81               | 43,86                | 56,14   |                        |
| 1146,41           | 91,86               | 43,90                | 56,10   |                        |
| 3069,97           | 246,00              | 37,15                | 62,85   |                        |
| 1023,32           | 82,00               |                      |         |                        |
| 643,19            | 51,54               | C=47,54              | O=46,64 | H=5,82                 |
| 1286,38           | 103,08              |                      |         |                        |
| 1929,57           | 154,62              |                      |         |                        |
| 1440,08           | 115,39              | 65,28                | 34,72   |                        |
| 2880,17           | 230,79              |                      |         |                        |
| 4320,25           | 346,18              |                      |         |                        |
| 1240,08           | 99,37               | 75,81                | 24,19   |                        |
| 2480,17           | 198,74              |                      |         |                        |
| 3720,25           | 298,11              |                      |         |                        |

| NOMINA.                          | FORMULÆ.                                                      |
|----------------------------------|---------------------------------------------------------------|
| <i>Acidum</i> Benzoicum. . . . . | $\ddot{\text{Bz}}=\text{H}^1\text{O}^1\text{C}^1\text{O}^2$ . |
|                                  | $\ddot{\text{Bz}}^2$ . . . . .                                |
|                                  | $\ddot{\text{Bz}}^3$ . . . . .                                |
| — Boricum. . . . .               | $\ddot{\text{B}}$ . . . . .                                   |
|                                  | $\ddot{\text{B}}^2$ . . . . .                                 |
|                                  | $\ddot{\text{B}}^3$ . . . . .                                 |
| — Bromicum. . . . .              | $\ddot{\text{Br}}$ . . . . .                                  |
|                                  | $\ddot{\text{Br}}^2$ . . . . .                                |
|                                  | $\ddot{\text{Br}}^3$ . . . . .                                |
| — Carbonicum. . . . .            | $\ddot{\text{C}}$ . . . . .                                   |
|                                  | $\ddot{\text{C}}^2$ . . . . .                                 |
|                                  | $\ddot{\text{C}}^3$ . . . . .                                 |
| — Chloricum. . . . .             | $\ddot{\text{Cl}}$ . . . . .                                  |
|                                  | $\ddot{\text{Cl}}^2$ . . . . .                                |
|                                  | $\ddot{\text{Cl}}^3$ . . . . .                                |
| — Chlorosum. . . . .             | $\ddot{\text{Cl}}$ . . . . .                                  |
|                                  | $\ddot{\text{Cl}}^2$ . . . . .                                |
|                                  | $\ddot{\text{Cl}}^3$ . . . . .                                |
| — Chromicum. . . . .             | $\ddot{\text{Cr}}$ . . . . .                                  |
|                                  | $\ddot{\text{Cr}}^2$ . . . . .                                |
|                                  | $\ddot{\text{Cr}}^3$ . . . . .                                |
| — Citricum. . . . .              | $\ddot{\text{C}}=\text{H}^2\text{C}^2\text{O}^2$ . .          |
|                                  | $\ddot{\text{C}}^2$ . . . . .                                 |
|                                  | $\ddot{\text{C}}^3$ . . . . .                                 |

| PONDERA ATOMORUM. |                     | PARTES CENTESIMALES. |                    |                        |
|-------------------|---------------------|----------------------|--------------------|------------------------|
| O = 100.          | H <sub>2</sub> = 1. | + E.                 | — E.               | H vel H <sub>2</sub> . |
| 1432,52           | 114,79              | C=74,70<br>Bz=93,02  | O=20,94<br>O= 6,98 | H=4,36                 |
| 2865,05           | 229,58              |                      |                    |                        |
| 4297,57           | 344,87              |                      |                    |                        |
| 436,20            | 34,95               | 31,22                | 68,78              |                        |
| 872,41            | 69,91               |                      |                    |                        |
| 1744,82           | 139,81              |                      |                    |                        |
| 1478,31           | 118,46              | 66,18                | 33,62              |                        |
| 2956,61           | 236,92              |                      |                    |                        |
| 4434,92           | 355,37              | 27,65                | 72,35              |                        |
| 276,44            | 22,15               |                      |                    |                        |
| 552,87            | 44,30               |                      |                    |                        |
| 829,81            | 66,45               |                      |                    |                        |
| 942,65            | 75,53               | 46,96                | 53,04              |                        |
| 1885,30           | 151,07              |                      |                    |                        |
| 2827,95           | 226,61              |                      |                    |                        |
| 742,65            | 59,51               | 59,60                | 40,40              |                        |
| 1485,30           | 119,02              |                      |                    |                        |
| 2227,95           | 178,53              |                      |                    |                        |
| 651,81            | 52,28               | 53,97                | 46,03              |                        |
| 1308,63           | 104,46              |                      |                    |                        |
| 1955,45           | 156,69              |                      |                    |                        |
| 730,71            | 58,55               | C=41,84              | O=54,74            | H=3,42                 |
| 1461,42           | 117,70              |                      |                    |                        |
| 2192,13           | 175,66              |                      |                    |                        |



ATOMIC WEIGHTS OF CHLORINE, SILVER, POTASSIUM, AND ZINC.—Laurent has made some experiments on the atomic weight of chlorine. The assumption of Berzelius' number perfectly agrees with the analyses made by M. C.; while considerable differences are visible if the atom be considered as a multiple of that of hydrogen. Marignac determines the atomic weight by passing hydrochloric acid gas over heated oxide of copper. He finds it 225·013, or thirty-six times that of hydrogen. From this he calculates the atomic weight of silver as 1374·0, and of potassium, 498·5. Jacquelin finds the atomic weight of zinc to be 414.—*Comptes Rendus*, and *Phil. Mag.*

THE MINES OF RUSSIA.—Russia now yields four times as much gold as all the rest of Europe, and the yearly produce of this metal (400 poods, or 16,000 lbs.) is sufficient to load from forty to fifty sledges. The silver needs for its conveyance a caravan of from 120 to 150 sledges. The platina requires but three or four, and the copper, which is also conveyed chiefly by land, sets in motion 5000 sledges. By far the greater part of these metals comes to the mint in Petersburg.—*Kohl's Russia and the Russians.*

#### ON THE USE OF SYMBOLS.

*To the Editors of the Annals of Chymistry.*

GENTLEMEN,—May I be allowed to inquire whether your new periodical, the ANNALS OF CHYMISTRY, is addressed exclusively to pharmaceutical chymists and professional men, or whether it is intended to shed its beneficial influences over the arts and manufactures generally which are dependent upon chymistry for their success? I am induced to make this inquiry from perceiving that, in many parts of your first number, you use symbols and a dead language to convey information which would, no doubt, be interesting to many persons not conversant with professional language.

I am one of that class, and no doubt there are hundreds of persons similarly situated, who would not only hail the appearance of such a work, but would also be enabled to contribute much *practical* information (I mean information derived from the observation of chymical processes conducted on the large scale) to its pages, who will be prevented either from subscribing or contributing to your work; the former, because they cannot understand its language; and the latter, because their simple experience would be completely extinguished by the imaginary lustre of the facts conveyed in (to them) the unknown tongue.

The Table of Atomic Weights, above all, to be generally useful, should be in our own language.—I have the honour to be, gentlemen,

Yours very respectfully,

Chymical Works, Bow Common,  
October 3, 1841.

J. H. R.

[We insert the preceding letter—one of many containing suggestions—as shewing that our expectations of exciting interest among practical men have been realized. For a reply to the observations of our correspondent, in reference to his first inquiry, we refer to Art. IV. and V. All objections to symbols, and the use of the Latin language, we feel to be answered by the remarks of Berzelius, contained in a note appended to the explanation of the tables contained in this number. We earnestly urge chymists, of all classes, to practise the use of these symbols, whose principal advantage is—they compel writers to think closely, and express their views accurately.—ED.]

\* \* \* *Communications, Books for Review, &c. are requested to be addressed*  
—“To the Editors of the ANNALS OF CHYMISTRY, care of Messrs. Longman, Brown, and Co. Paternoster Row.”

WILSON AND OGILVY, 57, SKINNER STREET, SNOWHILL, LONDON.

THE  
ANNALS OF CHYMISTRY  
AND  
PRACTICAL PHARMACY.

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No. 3.]      FRIDAY, OCTOBER 14, 1842.      [VOL. I.

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ADVANTAGES OF SCIENTIFIC JOURNALS.

It would be taking a very narrow view of the advantages derived from scientific journals, to consider them as mere registers of practical formulæ. This branch of their usefulness is, indeed, important, and bears most valuable fruit. The results of laborious analysis are placed before the reader in a few lines, and he is taught to act; but when the steps of the analysis are given, a benefit of equal magnitude is conferred, for he is taught to think. He is thus encouraged to apply himself to similar pursuits, where unwearied industry is almost sure to be rewarded by discovery, and where he finds to his surprise that successful investigation depends as much on the zeal with which it is pursued as on the talent of the analyst.

The timid student is too apt to distrust his own powers, and to fancy that the path of discovery can be trod by a few gifted men alone. Another mistake, by which many are depressed, is to suppose their lot cast in some department of science for which they have "no genius." "My friends *would* make me an engineer," cries one, "though my talents are all in the chymical line." "And mine," answers a sympathizing friend, "made me a chymist, though I was born an engineer."

Now, though we do not deny that genius has its limits, they are large ones; and though the mathematician could not be converted into a poet, he might take a wide range among kindred professions.

Had WATT been a chymist, he would probably have been as eminent as he was in mechanics; and FARADAY would have out-

stripped his contemporaries in engineering as he has in chymistry.

These remarks have been occasioned by the letter of an intelligent correspondent, who feels that a scientific journal circulated among druggists would enable them to claim the title of chymists, and speedily place them on a level with their continental brethren. This we believe; for we can bear witness, that the occupation of the retail druggist peculiarly fits him for scientific investigation. Surrounded by the materials of a laboratory, inquiries concerning the nature of the products which he vends seem to force themselves spontaneously upon him. His time is seldom so fully occupied as to deny him leisure to repeat the experiments of others; and the delight which they bestow is a sufficient stimulus to their pursuit.

When nature is thus interrogated by minds of various constitution, truth is discovered amid the recesses where she lies hid. For it often happens that one analyst, while eagerly following up a favourite hypothesis, looks at nature, if not through "the spectacles of books," at any rate through glasses coloured by prepossession; while another, less tumultuously fervid, and, therefore, less ready to jump at a conclusion, can give a more impartial, and therefore a more faithful, account of the same phenomena. Let none, then, shrink from following up the investigations of the greatest chymists. To discover striking facts, or to establish a large generalization, is given but to few; but to verify the labours of others—a feat within the reach of all—is not only practically useful, but certain to lead even to corrections of theory.

It is an old and a just remark, that no man can read a newspaper for six months, and remain untinged by its politics; and the principle will apply with still greater force, when periodical works on science are regularly perused by those whose avocations are the constant theme of their pages.

It is obvious how much the young student must be encouraged, in pursuing such trains of investigation, by perusing the pages of a scientific journal. By the side of the discoveries of a LIEBIG or a BERZELIUS, he will sometimes see the humble but not unprofitable attempts of a beginner like himself; and will be thus cheered in his progress from the easy plain of science to those ambitious heights, where

" Hills peep o'er hills, and Alps on Alps arise !"

## THE PURITY OF MEDICINES.

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THE phrase "sufficiently pure for medical purposes" occurs far too often in pharmaceutical works. It has been allowed to pass uncensured too long, and, though not to be expunged from the chymical vocabulary, should be used far less freely. The phrase should be confined to those cases where the impurities of the remedy have been accurately ascertained; how else can we be sure that "sufficiently" is the exact expression of a fact? Very seldom is this the case, however: too often the word is a convenient veil for the indolence of the experimentalist, who finds it easier to write a brief sentence than to undertake a long analysis. Yet this examination might be a rich mine of discovery; and while satisfying the physician of the purity of the remedy, might furnish fresh facts to the chymist.

Thus colchicum was supposed to owe its activity to veratrine, till a more accurate analysis separated the small portion of veratrine contained in its alkaloïd, and discovered that the remainder was colchicine.

As the phrase to which we object may give currency to bad medicine, so it may cast suspicion on remedies of undoubted purity. Thus, a distinguished teacher, when giving a formula for making muriate of morphia, unjustly stigmatized the product as "sufficiently pure for medical purposes;" whereas this valuable remedy may be obtained without foreign admixture, either by his formula, or the one of the London College.

The partisans of the *methode numérique* in France object to such words as *souvent* and *quelquefois*, when the effects of remedies on disease are to be chronicled. "How often," they ask, "does 'often' mean?—3 times in 12, or 5, or 7 times?" In like manner one might wish to learn what proportion of impurity is intended by the term "sufficiently pure." If this inquiry concerns the chymist, it is full of the deepest interest to the physician and the patient.

When exhausted by watching the restless couch of those who are nearest and dearest to us; when the life of the sufferer, and with it all that makes life precious to us, seem suspended by a thread, who would be satisfied with the cold and vague assur-

ance that the remedies were "sufficiently pure for medical purposes?"

Away then with this trite and injurious phrase, until some definite meaning shall have been stamped upon it; and though the chymist cannot attain remedies of absolute purity, let him be perfectly acquainted both with the nature and amount of the admixture. Let the honourable druggist aim at the highest point of perfection, and recollect that purity of drugs is no bad test of purity of character.

## CHYMISTRY, OPERATIVE AND EXPERIMENTAL.

### ART. I.—*On the Artificial Preparation of Rubies and Emeralds.*

HYDRATE of alumina, recently precipitated and well washed, is moistened with a few drops of neutral chromate of potassa, and kneaded so that the mass assumes a tinge scarcely perceptible; it is then rolled out into small sticks, about the thickness of a finger, and slowly dried, taking the precaution to fill the fissures that form during desiccation with fresh hydrate of alumina. When perfectly dry, one end of these sticks is brought into the termination of the flame of an oxyhydrogen blowpipe, until a portion of the mass is fused into a small globule. Boettger, to whom we are indebted for these results, observed, after the lapse of a few minutes, several minute balls of several millimetres diameter, of such intense hardness, that quartz, glass, topaz, granite, could be easily and perceptibly scratched therewith. When cut and polished, they appeared, however, slightly opaque. By employing nitrate of nickel in lieu of chromate of potassa, green-coloured globules, resembling the emerald, were obtained.

### ART. II.—*On the application of Binoxide of Hydrogen in Diving Bells, &c.* By M. DE SONDALA.

It occurred to the author that by means of this compound it might be possible to maintain air in a state fit for respiration, even in a very limited space, without renewing it.

The experiments that he has already made on the subject have confirmed the supposition that the peroxide of hydrogen may be used as a source of oxygen; the regulated evolution of which from the solution, will constantly furnish a volume equal to that absorbed by the action of the lungs, whilst by means of a certain proportion of hydrate of lime, contained in a receiver properly arranged, the constant absorption of carbonic acid produced during respiration may be regularly effected.—*Ibid. Sept.*

ART. III.—*On the Analysis of Oxgall, and the Characteristic Properties of its Elements.* By the Baron J. BERZELIUS.

[From the Kongl. Vet. Acad. Handl.]

ALTHOUGH certainly no animal fluid has been submitted more frequently to profound chymical examination, yet has the true composition of oxgall remained unknown for a longer space of time than that of most other animal fluids. The reasons of this are twofold—firstly, that fortuitous ways and means are required for separating those bodies whose constituents are previously unknown to us, especially in matters which contain several components possessing certain similar properties, and whose several peculiarities have to be discovered during examination; secondly, that the bodies mixed together in the gall have such a strong disposition to change into other bodies, that, as the experiments require to be continued for a long time, new products form, which were not contained in gall, in its natural state, previous to the commencement of the examination. To this may be added, that, under certain physiological circumstances, such changes occur in the component parts of gall whilst in the gall bladder, and previous to removal of the fluid therefrom. The consequence of all this is, a number of discrepant results obtained from experiment's which have been instituted for the purpose of ascertaining the composition of this animal liquid. Even to the present moment it is difficult to distinguish with precision which of the component parts found in gall appertain to this substance in its normal condition, and which of them are products of a spontaneous change insensibly taking place.

The work, which I have the honour of now presenting to the Royal Academy, was instituted with the view of making myself competent to judge which of the different opinions on the nature of the gall should be considered as that approaching nearest to truth, and to give in the lately published German edition of my "*Lehrbuch der Chemie*" a description of gall, based on these researches. Although this examination had been commenced a long time before its results were destined to be worked up in the new edition of the *Lehrbuch*, the subject was found to be much more complicated than I had presumed, and the examination could not be completed previous to the publication of the *Lehrbuch*, in the editing of which I however made use of those results which I had then already obtained. Meanwhile I have continued these experiments, have discovered several new facts, and have corrected previous views. These are the reasons which induced me to give the present explanation of my results, some of which have been already stated in the *Lehrbuch*, and others which were afterwards obtained.

Before, however, commencing the exposition of these results, I will briefly state the chymical history of oxgall. It has been

known from olden times that acids precipitate from gall a greenish, soft, tough, resinous body, and that the acid remains in solution combined with soda. This led me to the conclusion that gall might be a kind of resinous soap, a supposition partly proved by the fact that the precipitated resinous mass furnished with soda a regenerated gall.

By an analysis of gall, which I undertook in the year 1806, and upon the results of which I furnished a report in the article *Galla* D. II. of my *Föreläsningar i Djurkenium*, I found that this opinion could not be considered correct, because no resin is precipitated from healthy gall by acetic acid, and because the resin precipitated therefrom by sulphuric and muriatic acids contains, according to my experiments, a certain quantity of these acids combined; for by treating this precipitate with the carbonate of baryta or of lead, the resinous body was dissolved in water, whilst sulphate of baryta, or sulphate of lead, remained undissolved in the event of sulphuric acid having been employed as a precipitant. This led me to the conclusion that as albumen is not in like manner precipitated by acetic, although it is by mineral acids, this body might be a substance produced from the albuminous contents of the blood, still preserving some of the properties of albumen, whilst it lost others; I termed it therefore gall matter, and supposed that it was precipitated from gall by mineral acids for that reason, because it formed with the latter a combination not easily soluble, which property it does not possess with acetic acid.

Almost simultaneous with myself, Thénard undertook an analysis of the gall of several animals, employing a reagent not previously used for that purpose, viz., the acetate of lead, the neutral salt of which he mixed previous to application with the basic salt, in order to precipitate with greater certainty all that might be precipitable; and in this way he obtained one component part of gall, which could be precipitated by the salt of oxide of lead, and another not precipitable by this substance—the former of which (component parts) he termed galbresin, and the latter picromel. By combining, then, the separated resin with the picromel, which proved, however, a scarcely stable combination, he supposed himself right in the conclusion that these two component parts formed the properly characteristic bitter substance of the gall, and that the gall contained a bitter resin, dissolved in a solution of picromel.

In the year 1828, Leopold Gmelin instituted an uncommonly meritorious research on gall, when he separated from gall several new bodies—for instance, taurin and choleic acid, which had until then been entirely unknown. By comparing the two methods of analysis, he obtained the same results which both Thénard and myself had stated. He discovered, however, that the gall-resin of Thénard still contained picromel, and his picro-

mel still contained resin. The gall matter described by myself he found contaminated with baryta, or oxide of lead, according to whichever of these bases had been employed for separating the sulphuric acid. When he precipitated gall by basic acetate of lead, he obtained, after the separation of the oxide of lead, by sulphuretted hydrogen and evaporation of the liquid, a residue, which, after being concentrated to a certain degree, assumed a crystalline form, and this he termed gall-sugar, because he found that its taste was rather sweet than bitter; but he adds, that it contains the whole quantity of the soda of the gall combined with acetic acid. Gmelin therefore agreed, on the whole, with the opinion of Thénard, that the bitter component of gall consisted of a resinous, bitter body, dissolved in gall, by reason of the gall-sugar. The gall matter described by myself he believed to be composed of gall-sugar, resin, choleic acid, fatty acids, and taurin.

In the year 1838, Demarçay was occupied with experiments on the changes to which gall is subjected under continued treatment with acids, and also with alkalies, and obtained very remarkable results, which essentially contributed to the explanation of the nature of gall. All the deductions, however, submitted by him are not correct. He returned to the ancient opinion of the composition of gall, and supposed that it contained a salt of soda and a resinous acid containing azote, which was precipitated, after digesting a certain time, from the gall by means of sulphuric or muriatic acid, and which he termed *acide choleique*, or choleic acid. He proved that this acid is changed by means of long continued and nearly boiling digestion with sulphuric or muriatic acid, of a certain dilution, into another acid not containing azote, which he termed *acide choloidique*, or choloidic acid, during which process the mineral acid combines with ammonia, and taurin is formed besides, which could be obtained from the liquid quite pure. He further discovered, that if the component parts of gall, soluble in anhydrous spirit of wine, after removing the spirit of wine, be dissolved in hydrate of potassa, and boiled with the latter for a long time, the evaporating water being replaced from time to time, that they are entirely changed into ammonia and choleic acid; the former of which escapes with the steam of the water, and the latter remains behind, combined with the alkali, from which it may be precipitated by stronger acids.

[To be continued.]

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#### ART. IV.—*Stearic Acid.*

REDTENBACHER has purified margaric acid, obtained from Ox-tallow, in the manufactory of Mr. Merk, till the melting point



remained constantly at  $+70^{\circ}\text{C} = 158^{\circ}\text{F}$ ., and submitted it to a series of elementary analyses, whose results differ from those of Chevreul's experiment. Thus he obtained 76.71 of carbon, 12.86 of hydrogen, 10.46 of oxygen, which answers to the composition



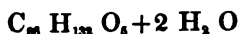
The silver salt consisted of



and the neutral lead salt of



Stearic acid is therefore to be considered as a bibasic acid=



By distillation of stearic acid, Redtenbacher obtained, like Chevreul, a little carbonic acid and water, an empyreumatic oil, consisting of carbon and water, and a white crystalline substance, having a melting point similar to that of stearic acid: this acid was neutralized with soda, and treated with æther, by which means empyreumatic oil and margarin were extracted, and an acid remained which was identical with hydrated margoric acid.

#### ART. V.—*Lactic Acid.*

BOUTRON and FREMY propose the following methods for the preparation of lactic acid:—From three to four quarts of milk are mixed with a solution of from 200 to 300 grains of sugar of milk, and kept two or three days in an open vessel at a temperature of from  $20^{\circ}$  to  $25^{\circ}\text{C}$ . The sour milk is then saturated with bicarbonate of soda, again exposed to a moderate temperature, and the saturation repeated until the whole of the sugar of milk is decomposed. The casein is then coagulated by heating, the filtered liquid condensed by evaporation, and the acid lactate of soda, extracted by means of alcohol sp. gr. 0.810, is decomposed by sulphuric acid: the sulphurate of soda formed is removed by filtration; and then the solution of lactic acid is distilled to remove the alcohol. The lactic acid remains then to be carefully evaporated, or, if required to be perfectly pure, the last part of the process may be repeated with advantage.

#### ART. VI.—*On the application of Cyanide of Potassium in Chymical Analysis.* By JULIUS HAUDELN and REMIGIUS FRESENIUS.

IN the treatise lately published by Professor Liebig on the production and application of cyanide of potassium, its admirable

applicability to the purposes of reduction and separation in chemical analysis was especially pointed out, and a number of cases were cited where separations, which, by the ordinary methods, were executed with difficulty or imperfectly, may be performed with facility by the application of cyanide of potassium. This raised a hope that on further examination of the behaviour of oxides, metallic sulphurets, &c., with cyanide of potassium, many interesting contributions to the general knowledge of their combinations with cyanogen, and especially its application to the purposes of chymical analysis, might be developed.

We undertook, therefore, this examination, as directed by Professor Liebig, in the laboratory of this place (Giessen), and executed it by controlling each other with all the conscientiousness required in a work to which nothing should be admitted by analogy, but where all ought to be decided by direct experiment. We had the satisfaction of realizing most of our expectations in the course of this examination, and are rejoiced in having obtained many results particularly favourable for the chymical analyst.

Before entering into a relation of our experiments and the methods of detection and separation deduced therefrom, we observe, that in all cases where no special indication is added to the word cyanide of potassium, we always intend thereby that mixture of cyanide of potassium and cyanate which may be obtained according to the process of Professor Liebig, viz., by melting ferrocyanide of potassium with carbonate of potassa. We investigated the behaviour of bodies towards this preparation particularly, as being especially important, since its manufacture is so very simple that it can be obtained in large quantities, both easily and cheaply—conditions without which the most valuable reagents can never come into general use.

Experience has shewn that some have failed in producing the cyanide of potassium by the before-mentioned method. We may therefore be permitted to offer some remarks on its preparation, as well as on the properties which it ought to possess in order to be applicable to analysis. A strict observance of the process pointed out by Professor Liebig cannot fail to attain the wished-for result. Three parts of carbonate of potassa are required for 8 parts of ferrocyanide of potassium, perfectly free from water of crystallization. The former must be quite dry and pure, and perfectly free from sulphuric acid. The fusion is best performed in a well-closed iron crucible, as cyanide of potassium, during fusion, easily penetrates into the substance of Hessian crucibles, and some silica is always dissolved thereby. If at the commencement of the operation a moderate red heat be uniformly applied, the reduction and separation of the iron is effected with more certainty. The cyanide of potassium obtained, in

order to be fit for use as a reagent, should assume the appearance, on cooling, of a milk-white mass, free from iron grains, perfectly soluble in cold distilled water, forming a clear, colourless liquid. Mixed in excess with hydrochloric acid, evaporated and treated with water, no residue (silicic acid) should remain behind. Salts of lead should produce a perfectly white precipitate; if, however, it has a dirty appearance, it is caused by the carbonate of potassa having been adulterated with sulphate of potassa, which is reduced into sulphuret of potassium by the cyanide of potassium. For the purposes of testing, we used a solution of 1 part of cyanide of potassium in from 6 to 8 parts of water.

We will first consider the action of different bodies on cyanide of potassium, and then proceed to the methods of detection and separation which are indicated by the results obtained. As the properties of cyanide of potassium are susceptible of two applications, the chemical analyses, which have scarcely any relation to each other, being used firstly as a means of separation by the moist way, and secondly as a means of reduction and liquefaction in the dry way (by fusion), our treatise, from this circumstance, is naturally divided into two parts.

[To be continued.]

#### ART. VII.—*On the Preparation of Oxygen Gas.*

*To the Editor of the Annals of Chymistry and Pharmacy.*

SIR,—If the process (the subject of this communication) is at all new to you, or your chymical readers, and you deem it of sufficient importance, you will greatly oblige me by giving it a place in your new, valuable, and much-wanted work, the Annals of Chymistry.—I am, sir,

Your most obedient servant,

J. MARSH.

Royal Arsenal, Woolwich, October 8, 1842.

It will be unnecessary for me, in this place, to refer to the several processes, commonly employed in the laboratory, for obtaining a supply of oxygen gas; all the trouble attending each of them must, of necessity, be well known to every chymist: but I may be allowed to state, that the substances now mostly employed for this purpose are the black oxide of manganese, and chlorate of potash.

The objection to the use of the black oxide of manganese is the great heat required to expel the oxygen gas from its combination, and the consequent rapid destruction of the iron bottle, whether made of cast or wrought iron, together with the inconvenience to the operator, in conse-

quence of the great heat, to which he must, of necessity, be exposed—not to mention the expense incurred in the process for the fuel required.

The objection that I have found to the use of chlorate of potash is the slowness of the process; the expense in fuel; and last, but not least, the frequent loss of the glass retorts, when used for this purpose: seldom, indeed, can the operator calculate (even when every attention is paid to the process) on saving his glass retorts from fracture, when liberating oxygen from the chlorate of potash; and the inconvenience of the rush of gas, which takes place at the latter part of the process, and the loss of gas sustained, if every precaution is not used to have all things, in the way of receivers, &c. in perfect readiness to collect, as the gas is expelled.

The process which I have found to answer the purpose perfectly, and to remove the major part, if not all, of the above-stated objections, is as follows, viz.:—Three parts of the chlorate of potash are reduced to a coarse powder in a mortar, and then mixed with one part, by bulk, of finely powdered black oxide of manganese. Red lead, black oxide of copper, and many other substances, can be used instead of manganese; but I prefer the manganese, because of its uniform action, and its cheapness, compared with these other bodies. After mixture, they are to be put into a common glass retort, or clean Florence oil bottle, to which must be attached a bent tube of metal, or glass if required. Every thing being arranged for the liberation and collection of the oxygen gas, the flame of a common spirit-lamp, or a few bits of ignited charcoal, placed in an old crucible, may now be applied; and in a few minutes the gas will be evolved, from the mixture in the retort, in great abundance. The little attention required, on the part of the operator, consists in regulating the heat; removing it for a few seconds when the gas is being expelled with great rapidity, and applying it more closely when it flags.

In this way, and by this simple alteration in the process, the oxygen is obtained with great celerity, and is under the most perfect command of the operator during the whole process; indeed, so easy is it to obtain an abundant supply of the gas in question, without loss or risk of any kind, that it resembles in simplicity and rapidity the well-known process of obtaining hydrogen by the aid of zinc, sulphuric acid, and water.

The residue left in the retort after the operation, and when cold, is easily removed by the aid of clean water, and if the salt is washed out by a plentiful supply of water, the manganese oxide, or any other oxide used in the process, when dried, may be employed again for the same purpose.

The foregoing process was first made known to me by Mr. George Southby, son of the celebrated artist in fireworks, &c., Mr. Southby, of the Surrey Zoological, and late of the Vauxhall Gardens; and it is to

him that I am desirous of giving the credit of this useful discovery; for simple as the alteration is in itself, it still is of the greatest value to the practical chymist in its application, as a quick and ready means of obtaining a supply of oxygen gas cheaply.

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ART. VIII.—*New Antidote to Corrosive Sublimate.* By M. L. MIALHE.

THE results of some chymical experiments of M. Mialhe have informed him that the hydrated protosulphuret of iron, a perfectly inert body, possesses the valuable property of instantly decomposing corrosive sublimate, forming protochloride of iron and bisulphuret of mercury, two substances perfectly harmless—a property which has caused him to announce that the hydrated protosulphuret of iron is, *par excellence*, the antidote to this terrible poison.

When the most minute portion of corrosive sublimate is introduced into the mouth, an insupportable and characteristic metallic taste is instantly perceived; it is simply necessary to raise the mouth for a few seconds with the sulphuret of iron, when the mercurial taste disappears as if by enchantment.—*Ibid.*

[The hydrated protosulphuret of iron may be formed by adding to a solution of sulphate of iron (green vitriol), a solution of bihydrosulphuret of ammonia, until no further precipitate is formed, collecting the precipitate on a filter, and washing to free from excess of precipitant. It should be prepared as wanted, since by exposure to the atmosphere gradual decomposition ensues, with formation of peroxide of iron.—ED.]

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## CHYMISTRY APPLIED TO AGRICULTURE.

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ART. IX.—*On the Nourishment of Plants.* By TH. DE SAUSSURE.

[Continued from page 40.]

No one entertains a doubt that the albumen, or starchy *endospermium* of wheat, flows into the growing plant, for the purposes of nutrition. So long as the emulsion secreted in this reservoir is not exhausted, iodine causes it to assume a blue colour; when, however, it has entirely passed, or partly so, into the plant, it is changed, and the sap of the young plant tested with iodine will no longer indicate the presence of starch. Now the decomposition of carbonic acid, and the assimilation of water, do not seem to have contributed in any considerable degree to the first development of the plant, for its weight has not been increased by them, even admitting into the calculation

that carbon which it lost during this process of growing. The nourishment must, therefore, in a great measure, be attributed to the assimilation of the component parts of the starch by the plant.

It is true that this starchy matter is not carried into the plant by the roots, but neither is it essentially requisite for the growth of wheat, for if the greater part of the endospermium be removed from the germinating wheat, and the roots of the germinating seed be put into mould, they will at the commencement make slower progress than the perfect grain, but such progress will afterwards be sufficiently visible to prove a similar development, and that the extractive introduced by the roots has replaced the starchy fluid. Besides this, the examination of young shoots of corn in the fields, where the albumen is frequently destroyed by putrefaction or insects, proves this, as well as the before-mentioned experiments. Since, then, the assimilation of the elements of the endospermium has been proved, that of the extractive of mould, which is introduced by the roots into a plant, is equally proved.

In water transpired by plants fed with the extractive of mould or humate of potassa, I endeavoured to detect the extractive matter which had been absorbed.

This colourless transpiration, if not very much concentrated by evaporation, showed a slow deposition, by its light yellow colour, of some traces of organic matter, which, however, did not amount to the twentieth part of that absorbed by the plant. The water transpired from the plants nourished with the above described solutions contained besides salts of ammonia and lime, whose combined weights amounted, however, to not more than 3 milligrammes ( $=0.003$  grs.) in 60 grammes ( $=60$  grs.) of transpired fluid.

The plants of *Polyg. pers.*, which continued to grow uninjured for several weeks in closed vessels by means of water, and subject to the influence of day and night, did not vary the purity or volume of the air therein contained; they had, therefore, not absorbed any azote. I mention this result, which remained the same after germination had commenced, in order to direct attention to the fact, that the absorption of azote from the atmosphere is not at all proved, although the elementary analyses of some dead plants by M. Boussingault seem to indicate a contrary result.

We must, on this account, adhere to direct observations; for the elementary analysis of dead plants seldom harmonizes with the physiology of the plant whilst living. These analyses deceive, because the changes which the green plant undergoes whilst drying are not taken into consideration. Exsiccation (especially under the free influence of the atmosphere) diminishes the

absolute quantity of the elements of a plant, and changes their proportion. The atmosphere extracts carbon from them; oxygen is frequently absorbed; the albumen becomes black; the aqueous parts are diminished, and the acetic acid of the sap volatilized. During the long period of growth required by plants subjected to this experiment, some of their parts cease to vegetate, ferment, and then are incapable of assimilating azote. These changes depend on the nature of the plant, and probably it is impossible to define them accurately.

In affirming that the nutrition of plants, even in the most fruitful soil, takes place through the decomposition of carbonic acid, by assimilation of the elements of water and absorption of the salts, Dr. Liebig grounds his doctrine on the inadequacy of the soluble organic matters contained in the soil from which nutrition proceeds. Before examining the facts adduced by him on this subject, we must acknowledge that plants can increase their organic substance without any other means of nourishment than water and atmospheric air; but we shall find at the same time, that such plants, produced by this kind of nourishment, are of scarcely any value in agriculture.

The results adduced in support of the opposite opinion were already known under other forms, and had been rejected on account of their want of accuracy. Those, therefore, which were obtained with young plants must be excluded, for they began to be developed in vegetable earth, and produced new plants with spring water without mould.

By employing such young plants, their nutrition is for the most part—independent of the impurity of spring water—attributable to the transference of the organic matters of these small plants into all those parts which are in the course of development. These results are very different if the experiment is undertaken with seeds, whose development is effected simply by means of distilled water and atmospheric air. After I had sown some bean seeds, nourished in this manner, in a glass vessel filled with pure sand, their dry vegetable matter was increased only in the proportion of twice their weight. Peas cultivated in this manner yielded plants whose weight, in a dry state, amounted to only three and a quarter times the weight of the seed; while, in vegetable earth, the increase was, in the proportion to these former, of from one to sixty. The seeds nourished by means of distilled water were however able, after having been planted in garden mould, to imbibe the matters evolved from the vegetable earth. In the examples I have adduced, if we suppose a deficiency, the smallness of the plants, obtained by water and atmospheric air without foreign substances, is, however, a result which cannot be gainsaid, whether fructification has taken place or not.

Mould nearly infertile, exhausted by the filtration of rain water, cannot furnish any considerable quantity of extractive matter. It always, however, contains a small quantity, which may be discerned by its yellow colour and taste, after the water in which it has been soaked is removed by evaporation. This matter, which contains azote, and which is easily soluble in water after drying, has a powerful action on the nutrition of plants, for it furnishes them with an essential means of nourishment, viz. azote, which, indeed, they only contain in a small quantity, and with which they are insufficiently provided by water and air; and it also furnishes them with phosphate of lime, and a portion of those salts which form the ashes. This nourishing property must not, however, be ascribed in preference to the soluble extract which can be drawn immediately from a similar earth; it contains a much larger quantity of organic matter, which at first is insoluble in water, and which is imperceptible to the eye, but which, however, by its solubility in carbonate of potassa, or by combustion, can be detected. When moistened, this substance is continually in a state of slow fermentation, which forms an extractive matter easily soluble in water. This process thus furnishes the plant with a continual source of nourishment. The last saturations produce, at least under fermentation, which is effected by contact with the atmosphere, an extractive matter deeper coloured than the preceding.

The renewed supply of extractive matter can be performed by fermentation without contact with the atmosphere. In this case, however, the renewed supply is much more limited. One disadvantage of imperfect contact is, that it prevents the escape of acetic acid, which is prejudicial to the growth, and which acid does not meet with any base with which it can unite.

One of the most remarkable effects of the fermentation of moistened vegetable mould is to effect the union of oxygen and hydrogen without perceptible generation of caloric. It is produced on the small scale by an almost white clay, (as that of Morat,) which does not contain any organic body, and which thus furnishes a proof of fermentation taking place without betraying any signs of that operative.

[To be continued.]

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ART. X.—*On the Action of Ammonia on Plants.*

By JACOB KLIER.

(Epistolary communication to J. LIEBIG.)

I HAVE a dozen specimens of *Gardenia radicans*, which usually begin to lose their leaves in the month of November, so that in the beginning of January they are altogether bare. I directed



the gardener who has the care of watering these twelve *Gardeniæ* to add to the measured water destined for one of them three grains of ammonia.

The eleven remaining *Gardeniæ*, which did not receive any ammonia, are now bare and leafless; whilst the twelfth, which received ammonia, did not lose four leaves out of a hundred. As these plants, when watered with rain water, thrive better than when watered with that drawn from the spring, and rapidly decay in earth containing animal excrements partially decomposed, the application of carbonate of ammonia seems, then, to possess some peculiar advantages.

In your work on "Organic Chemistry, in its application to Agriculture," p. 36, you mention, "The rose sprig planted on a citron tree does not produce lemons; it produces roses." The existence of such plants is undoubted; it is, however, not less certain, that the whole is a fraud of gardeners, managed in the following manner:—They pierce the marrow of a citrus, and introduce the stem of a rose sprig through the hole in such a manner that the under end of the sprig enters into the soil as deep as the rose sprig would require if planted where it takes root, and produces blossoms in the ordinary manner, as if it were not surrounded by an artificial covering. It is evident that the rose branch is not nourished by the citrus, as is the case in grafting a scion of an improved kind of fruit with another of indifferent species.

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#### ART. XI.—"Our Pharmacopœia."

WE are compelled, for want of space, to defer an article we had prepared under this head, having for its subject *ACIDUM ACETICUM*. We deem this notice requisite, lest it should be inferred we are neglectful of this important feature of our publication.

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### PRACTICAL PHARMACY.

#### ART. XII.—*Proposals for remedying the Scarcity of Leeches.*

By Dr. WAGNER.

(From the *Allgemeine Anzeiger der Deutschen*.)

[Continued from page 54.]

I RECOMMEND a similar arrangement, on a small scale, to all my colleagues, at least whilst leeches maintain their present high prices, in order to procure for the poor man that remedy which is as indispensable to him, in many cases, as to his richer neighbour.

It must, however, be observed, that precautions must be taken to prevent the following enemies of the leech from approaching the tanks: viz. pigs, ducks, geese, all fishes of prey; also the little stickleback, or miller's thumb (*Gasterosteus aculeatus*); horse-leeches (*Hirudo sanguisuga* and *nigrescens*), for they subsist on small soft-water insects, and the very young leech is, therefore, a favourite food for them; rats, both the *Mus rattus* and *M. decumanus*, and especially *Mus amphibius*, who would, in a short time, speedily destroy the whole breed of leeches; also the water-shrew (*Sorex fodiens*.) Flax should never be allowed to steep in the tanks. Neither should large pieces of carrion be thrown into them. Both snuff and salt disagree with the leech; wherefore the smallest quantity of either must be carefully kept from the breeding-tanks. Leeches are exposed to a complaint which may be termed the knot disease, a dreadful plague among them, particularly on account of its infectious nature. Should some rascal throw leeches thus diseased into the tank, the whole stock may be lost in a short time. During a thunder-storm, with heavy rain, and in summer-time, the leeches like to creep out, especially if the tank is surrounded with turf or mud; wherefore it is very useful to encircle the turf, to a short distance, with a small ridge of sand, as they are, by this means, prevented from leaving the place\*. If the water be stirred in any way, especially on hot days, and even during the night, the leech approaches thither, led by instinct, it would seem, to scent the presence of any being containing blood. A thief closely covered with linen may therefore clear the whole stock in one warm night. The leech-breeder has, therefore, to keep careful watch night and day, if he would avoid considerable losses, or, perhaps, lose the whole number.

The tanks should be formed with the bottom of loam clay, or turf, surrounded by a border composed of similar substances; the bank not too high. Some water plants should be cultivated in them, especially *acarus calamus*; and it is advisable, at the same time, to surround them with a grass-plot or turf. There should not be a strong current in the water; and that which is conducted into the tanks should always have been previously exposed to the air. Cold springs in the neighbourhood will be found equally detrimental to the prosperity of leeches as a thick canopy of trees over the tank. The shade yielded by water-plants is sufficient for their protection. The tanks must be rather deep, and filled at the bottom with mud, so that the leeches may, as taught by instinct, descend far enough in order to protect themselves against frost during winter. It is, how-

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\* This hint is available for leech-jars, which then would require neither covers nor tying down; a rim, sprinkled with sand, being sufficient to retain them.

ever, advisable, in severe weather, to make an opening for air daily in the ice.

No leech ought to be taken from the first breeding-tank until a year has elapsed after having been employed for medical use and fed with human blood, nor before the month of September (never before the end of August), with a view to their removal to the second tank for use, because, otherwise, they would be disturbed during the breeding season, and whilst the cocoons are forming, whence the young leeches creep out. Although leeches are of an andiogymous tribe, they gather (as my late brother, Pastor Wagner, at Lebusa, observed, more than thirty years since), during spring into lumps, as soon as it becomes warm, near the banks, but never at the bottom, when they generate; and there form among them small lumps of foam, which are gradually covered with a skin, resembling minute washing-sponges of the size of the cocoon formed by the silk-worm, assuming, at the same time, a loamy colour. They contain holes—glassy inside—which are filled with albumen; and in this substance the small young leech forms by degrees, escaping from the pointed end, which they break through at the end of July, or the beginning of August, to the number of from four to sixteen, and sometimes more.

If leeches had not been treated hitherto with so much neglect, and even murderously; if, instead of killing and throwing away those which have been used, they had been kept and employed again for bleeding, they would now be abundant and cheap, where they are scarce and dear; and if the same treatment be continued for a few more years, it may with certainty be inferred that this useful animal will soon be entirely lost to us. In this country, Thuringia, twenty years ago, leeches were in such abundance that, on entering the ponds in which they abounded, men and beasts were scarcely safe, and young fowls have been killed by them; whereas now, dealers have been sometimes obliged to fetch them from a distance of 600 miles and more. Some dealers, indeed, proceed as far as Tschirkessia. But there, as well as every where else, they will soon be consumed if the present wasteful system be persevered in.

However great and extensive the loss may have been, there is yet a possibility of preventing the complete annihilation of this useful animal; they may be restored in a few years, but only provided, throughout the whole country, breeding establishments, as before described, are instituted on a large scale, and henceforward not a single leech, unless dead, should be thrown away, but all, whether small or large, should be restored to the breeding tanks. If we do not revert to this plan, it will not be possible to obtain the quantity of leeches which are daily required; for all the mother leeches are, by the present system,

lost: even if the number of artificial breeding establishments should be extensively increased, still the new addition will gradually be less and less, and finally cease, especially since a young vigorous generation cannot be obtained without proper feeding. If in a farm all the mother sheep were annually killed, how long would there remain a herd, even if fed with the best food, and presuming the flock to amount to any number? In breeding leeches, and throwing away those which have been fed with blood of men, the whole remain without food. The leech, however, if it be in good condition, able to grow and to propagate, must, as already mentioned, at least once in the year, receive a plentiful supply of blood. How is it possible to attain this end without restoring those already employed, and therefore nourished, according to the laws of nature? Feeding by means of thin bladders filled with blood, or of sponges similarly prepared, or by means of vessels half filled and placed on the water, or fixed any where, or thrown into the tanks (this might be done with the former), will not answer the purpose required: they furnish merely unnatural nourishment, which the leeches either entirely refuse, or, if they partake of it, are rather injured than properly fed, as blood quickly putrifies. Neither will the blood of frogs, or of fishes without scales, suffice where leeches are kept in a large quantity. In short, few leeches, and those but poor specimens, can be reared in this way. If, on the other hand, matters be arranged according to these proposals, if simple and natural treatment be had recourse to, without great expense, not only will vigorous leeches very soon be obtained, but, at the same time, in abundance; for as the breeding leeches and the young stock are kept living together, they must increase and multiply to an immense extent.

The experiments which I have made on a small scale convince me that not more than ten years would be required to replace matters in their former state, and to procure an abundant supply of leeches; and then all the money which is now paid for the importation of leeches would be saved, especially if breeders followed the prudent plan of giving out the young leeches as soon as they are able to suck—employing them on children; because they then arrive in half the time at their ordinary size, and become, moreover, more vigorous. I can easily imagine that these proposals may want many alterations and amendments. The principle, however, is true and invariable; and that is, *that old and applied leeches should not be thrown away, but employed for breeding and propagation.*

Although many pretend, at the present moment, that we should cure all diseases by water—an excellent adjunct to the preservation and restoration of health, and as such acknowledged by every physician—yet this will not stand the test in all cases.

Among others, we may adduce those lately proved by Dr. Beer, at Gotha, in his excellent paper on Hydropathy—an agreeable, modest, and, at the same time, very clever brochure. We are convinced we shall continue to want other vigorous curatives, of which leeches are one of the most important. It is, therefore, the duty of all physicians to assist in preventing the consummation of that utter extermination already commenced, for which purpose I address all my brother physicians, recommending establishments for leeches, at any rate on the small scale, wherever and whenever opportunities for their establishment occur.

[The proposals of Dr. W. have since been strongly recommended by the editor of the German *Annalen d. Chemie*, Dr. J. Liebig. If occasion should have arisen in Germany, whence our supply of leeches is principally drawn, for the publication of the preceding arguments and suggestions, how much more important is it that we should at once put them in practice in England, where we have utterly exterminated the indigenous stock. We therefore earnestly appeal to our medical brethren to remove the prejudice now existing against leeches that have been once applied, to which we think the most fastidious will not object, when twelve months shall have elapsed since their application; and we would then confidently entrust their detailed management to the intelligent druggist, assured, as we are, that the traffic in leeches has of late years been of a character to render a more plentiful supply truly desirable.—ED.]

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ART. XIII.—*On certain Articles in the Russian Trade.* By  
DR. F. GOEBEL.

[Continued from page 53.]

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6. GALBANUM AND SAGAPENUM. (DR. FR. GOEBEL.)

GALBANUM is transported from Persia via Astrachan into Russia, and thence again exported, in considerable quantities, from St. Petersburg. The druggists of St. Petersburg open the original packages, and assort the contents into different kinds, in order to satisfy the demands of their different customers. Thence arise the distinctions of Galbanum in granis, G. in sortis, G. in massis, &c. which are given to the separate parcels. In the original packages all these varieties of galbanum particularized in the Price Current are mingled together. Sometimes, however, one package contains a very fine quality; whilst another of the same lot is filled with a very indifferent mass.

How careless the Persians are in gathering this important drug appears, among other reasons, from the circumstance that among twenty-eight to thirty packages of galbanum, two, three, and even four packages will sometimes be found which contain

no galbanum at all, but, in lieu of that drug, sagapenum, which is never separately imported under this name, but always received among the packages of galbanum, and marked as galbanum. Dyrsen assured me that, even in one and the same package, galbanum and sagapenum have been repeatedly found. It is, therefore, proper that the original packages should be opened and examined by the druggists of St. Petersburg.

During my sojourn at Astrachan, in the summer of 1834\*, I observed in one of the stalls in the Persian market-place a portion of galbanum exposed for sale. It was packed in hides, the hairy side inwards; and these again sewed up in mats, and bound round with ropes. These packages had the shape of large flat cakes of three feet in diameter, and one in thickness. The weight of such cakes amounted to about sixty or eighty pounds. There were perhaps some thirty of these parcels together, and one only of them opened in order to give an opportunity of seeing and examining its contents. The galbanum was of that soft kind which is generally sold, of a yellowish brown colour, not mixed with grains, but of an exceedingly penetrating odour. The sale of this drug is effected in a peculiar manner. The purchaser has the right to open any one bag he chooses, to examine its contents, and to make his offer according to its quality. The other bags are only allowed to be opened after the transaction; and the loss or profit, according to the better or inferior quality contained in them, is at the risk of the purchaser. One single bag is never sold: the whole parcel is always disposed of in one lot. The seller at Astrachan, who is merely the broker, generally an Armenian, knows as little as the purchaser of the quality of the drug in the several bags before they are opened. This explains the above-mentioned circumstance of the sagapenum being contained in the packages. The price of the galbanum there stored was then very moderate, viz. 2 rub. 82 kopecks S.M. (= 9s.) the pud (= 40 lbs.); that is, 7 kop. S. about 2½d. per pound.

Ammoniacum is also imported from Persia by Astrachan: asafoetida never: this is always brought from England into Russia.  
—*Liebig's Annalen.*

#### ART. XIV.—*Concentrated Camphor Julep.*

R Camphoræ,  $\frac{3}{4}$  1ʳ.

Alcoholis† .  $\frac{3}{4}$  10ʳ (pond.)

Guttæ vigintæ ad fluidunciam unam aquæ destillatæ.

THE above preparation has become, like the concentrated infusions, an article of common traffic with wholesale druggists; but,

\* Goebel's Journey into the Steppes of the South of Russia, p. l. p. 164.

† Spirit of wine digested on dry carbonate (*subc.*) of potassa, with a view to render it as anhydrous as possible: after pouring off, it should be redistilled, since otherwise it is contaminated with a minute quantity of the alkali, which must be neutralized with a drop or two of acetic acid.

unfortunately, various are the formulæ by which it has been prepared. Some concentrated essences of camphor we have found to contain muriatic acid. The difference between the product afforded by the above preparation and the *mistura camphoræ*, P. L., consists simply in the addition to the constituents directed by the College of about three drachms of alcohol to the pint of distilled water= $9\frac{1}{2}$  grs. to the ounce. Whenever, therefore, tinctures or spirits have been prescribed, it may be inferred that this preparation is admissible; but in all cases of inflammatory diathesis, where stimulants are contra-indicated, and the sedative effects of camphor are desirable, it must be rejected. The data on which the above formula has been calculated are as follows:—By experiment we ascertained that camphor, finely divided by means of S. V. R., dissolves in the proportion of 24 grains to one pint imperial of distilled water. M. Soubeiran, in his *Traité de Pharmacie*, announces the proportion as being 1 to 333.3= $29.1$  grains to the imperial pint, almost exactly the Collegiate formula, which is 30 grains to the like quantity. Our experiments, however, indicate this to be an over estimate; and, trifling as the experiment may appear, yet the following minutiae are apt to vitiate the results:—Using an excess of spirit to divide the camphor; allowing the spirit used to evaporate, when a portion of camphor is sometimes volatilized. If heat be employed in drying the residue after digestion, a similar error results; or if the camphor be left for some time in contact with water exposed to the atmosphere, absorption of carbonic acid ensues, and an undue proportion of camphor is dissolved. Setting out with the fact, then, that one pint imperial of distilled water is capable of dissolving 24 grains\* of camphor, and no more, we found that the concentrated solution of camphor, whose proportions we have mentioned, when added to distilled water in the proportion of 20 drops = 10 grains by weight (Duncan), of the former to one fluidounce of the latter, the mixture retained its limpidity, and differed only from that of the P. L. in the particular which has been mentioned; whilst it possesses the contra advantage of enabling the prescriber to administer a full dose of camphor in solution. This preparation, it must be confessed, is a substitution, but one which we hope will, in the next edition of the P. L., be substituted for the present hydropathic formula.

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ART. XV.—*Interesting Observations on the Physical Effects of Camphor on Resins.* By M. PLANCHE. (Soubeiran's *Traité*.)

CAMPBOR, mixed with resinous matters, possesses remarkable properties; for instance—

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\* This quantity is usually designated by the terms *very little*, a *very small proportion*, *sparingly soluble*, *exceedingly small*, in works we have had occasion to consult.

1. Certain mixtures take a pilular consistence, and maintain it for an indefinite term, viz.

|                   |  |           |
|-------------------|--|-----------|
| Sanguis draconis. |  | Guaiacum. |
| Assafoetida.      |  | Galbanum. |

2. Others, having at first a pilular consistence, afterwards soften when exposed to the air. These are—

|                    |  |             |
|--------------------|--|-------------|
| Benzoinum.         |  | Ammoniacum. |
| Balsamum Tolutani. |  | Mastich.    |

3. Others maintain a semiliquid consistence :

|            |  |               |
|------------|--|---------------|
| Sagapenum. |  | Resina Animi. |
|------------|--|---------------|

4. Others present a gritty pulverulent appearance :

|             |  |           |
|-------------|--|-----------|
| Olibanum.   |  | Bdellium. |
| Opopanax.   |  | Myrrha.   |
| Cambogia.   |  | Succinum. |
| Euphorbium. |  |           |

5. Others are altogether pulverulent :

|                |  |                  |
|----------------|--|------------------|
| Tacamahaca.    |  | Resina Juniperi. |
| Resina Jalapæ. |  | Resina Cinchonæ. |

6. In certain mixtures the smell of camphor disappears :

|              |  |                    |
|--------------|--|--------------------|
| Assafoetida. |  | Resina Animi.      |
| Galbanum.    |  | Balsamum Tolutani. |
| Sagapenum.   |  |                    |

7. Certain mixtures preserve but feebly the smell of the camphor :

|                   |  |             |
|-------------------|--|-------------|
| Sanguis draconis. |  | Opopanax.   |
| Olibanum.         |  | Tacamahaca. |
| Mastich.          |  | Guaiacum.   |
| Benzoinum.        |  | Ammoniacum. |

8. Many resins increase the smell of camphor, or retain it powerfully :

|                |  |                     |
|----------------|--|---------------------|
| Cambogia.      |  | Scammonium.         |
| Euphorbium.    |  | Resina Juniperi.    |
| Bdellium.      |  | “ Scammonii (pura). |
| Succinum.      |  | “ Abietis.          |
| Myrrha.        |  | “ Cinchonæ.         |
| Resina Jalapæ. |  | “ Flava.            |

[The value of the above classification will be recognised by the physician in prescribing, not less than by the dispenser or pharmaceutical chymist, who, in the several preparations of mixtures, powders, pills, and plasters, where camphor has to be compounded with resinous matters, will be able to anticipate the effects of such precautions as may be necessary to attain desirable results.—ED.]



ART. XVI.—*Action of Steam on the Protochloride of Mercury (Calomel), and suggestions as to its administration with substances containing Alkaline Chlorides.* By JEAN RIGHINI.

WITHOUT wishing to interfere with the opinion generally held in favour of calomel prepared with the aid of steam, but merely with a view to the promotion of science, I am desirous of communicating a fact which I have recently observed—a fact from which I think it may be inferred that the atomic constitution of this haloid salt is imperfect, in the sense that the grouping of the atoms is not of a perfectly solid nature, but that it submits, when exposed to aqueous vapour, to an action sufficient to cause one portion of the protochloride to pass into deutochloride.

The following experiment supports the preceding observation:—

I passed steam, from a cast-iron pipe, through a glass tube, containing pure calomel, which had been levigated. The condensed vapour was received in a glass retort, surrounded with ice. Half an hour after the aqueous vapour had traversed the calomel, I observed that the calomel had been partially volatilized with the vapour, and that it had passed into the recipient in a state of extreme division. I tested the condensed aqueous vapour, by means of the iodides of potassium and sodium, and observed a red vermilion deposit; with lime water, a red precipitate, inclining to yellow; with bicarbonate of potassa, a precipitate reddened by the iodides, and whitened by ammonia. The alcoholic tincture of iodine produced no change, excepting a slight deposit of iodine. These indications prove sufficiently the presence of the deutochloride of mercury. Now, if we suppose that steam is actually a source of accumulated electricity, as demonstrated by many papers published in scientific journals, the probability that such electricity is able to cause the decomposition of calomel during preparation appears admissible, after the experiment mentioned above.

Presuming that the reaction of steam on calomel has the merit of novelty, I may be allowed to mention to the judicious critic some ideas founded on its mixture with alkaline chlorides, and particularly in reference to its contact with chloride of ammonia.

I have mixed twelve grains of calomel, twelve grains of hydrochlorate of ammonia, and twelve grains of sugar. I have added this mixture to an ounce of distilled water, and have left the whole to digest, during twelve hours, at a temperature of  $36^{\circ}$ , R. =  $113^{\circ}$  F. I have afterwards examined the solution, in which I have not been able to perceive any trace of corrosive sublimate; the calomel appeared to have a slight tint of a very light chocolate colour (*couleur de café au lait*) on the surface. This expe-

periment repeated, with the chlorides of potassium and sodium, yielded similar results.

These experiments prove, that, at the temperature of the human body, calomel is not affected by alkaline chlorides, so as to pass into the state of sublimate. The medical man frequently administers pure calomel, with extract of henbane and squilla. The analyses of these vegetables prove the existence of chlorides in the extracts prepared from them. It is nevertheless a fact for which I can vouch that these remedies, properly prepared, have not given occasion to any complaint of poisoning.

I may then be allowed to deduce this conclusion—that true calomel, that is to say, that in which the atoms are properly combined, if administered in conjunction with substances containing small proportions of chlorides, as for instance in the extracts which I have mentioned, cannot transform such calomel into the deutochloride, (sublimate) as advanced by authors who have narrated other experiments, and consequently that by depriving the therapist of such a remedy, we take away a medicine from which the happiest results and effects are daily obtained.

In reference to the above communication of M. Righini of Ollegio, M. Lepage entirely corroborates the Italian chymist by the following resumé of his (M. L.'s) experiments:—1st, Chloride of mercury (calomel) perfectly exempt from deutochloride (sublimate) mixed in equal proportions with hydrochlorate of ammonia or any other alkaline chloride, and digested in distilled water, at a temperature of 38° or 40° C = 98° or 104° F., during 24, 36, and even 48 hours, had not changed colour. The filtered liquid gave no indications whatever of the presence of a mercurial salt, on the application of the appropriate tests.

Pigeons, to whom this liquid was given to drink during several successive days, experienced no inconvenience whatever, neither had the calomel sustained any sensible diminution of weight.

2d, The same mixture, exposed to a temperature of 50° or 60° C = 122° or 140° F., gave a liquid which produced no effect with tests for mercury, nor on the animal economy, acting precisely as that previously mentioned.

3d, Nevertheless, by prolonged ebullition, and under the influence of chlorine in excess, transformation took place, but only partially.—*Journal de Chimie Médicale.*

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#### ART. XVII.—*On the Preparation of Calomel by the aid of Steam.*

By E. SOUBEIRAN.

FRENCH and English physicians, almost exclusively, prescribe a calomel prepared with steam, which they find more effective.

The mode of preparing it is that introduced by Josias Jewel, of Stratford, with some modifications contrived by Ossian, Henry, and others, which consist in the simultaneous introduction of the vapour of water with the subliming calomel into the condensing vessel. Our (the French) manufacturers employ this method; and I myself have adopted it for several years in the Pharmacie Centrale, although far from satisfied with it. There is great difficulty in conducting the operation. It requires much practice; and a great deal of the product is frequently lost by accidents. At the same time, the calomel prepared in France, by the aid of steam, is neither so white, nor so finely divided, as the English. The process which I am about to describe is preferable to all other methods of preparation hitherto made known.

Instead of steam, which is introduced between the particles of calomel with a view to prevent their union, I employ a current of air, which, by passing over the heated calomel, carries off the subliming vapour, while, at the same time, it assists in the condensing it in the form of an impalpable powder. I heat the calomel, in an earthen tubular-shaped vessel, in a stove, uninterruptedly passing through it the atmospheric current of a centrifugal ventilator (by Dolché). The vapour is condensed in the recipient. If straight tubes were employed for this purpose, the steam would be carried out to a distance of 10 feet.

In order to prevent this, a tube is attached to the earthen apparatus, one end of which dips into water: the air, continually escaping, causes a bubbling, by which arrangement the finely divided calomel is moistened and precipitated. This operation, after repeated trials, I find to be easy in practice, and not liable to interruption by accident, even if from one to two killogrammes = 2 to 4 lbs. of calomel be manufactured at a time.—*Comptes rend. t. xiv. N. 18.*

## GALVANISM AND ELECTRICITY.

### ART. XVIII.—*Instantaneous Method of obtaining Daguerreotype Proofs.*

M. ARAGO exhibited, at the sitting of the Academy of Sciences, some daguerreotype proofs, obtained by M. Bisson, jun., by means of bromine, associated with chlorine, without using the iodine box. Each of these proofs was obtained in a very short time (half a second), which allowed very fugitive subjects to be represented—for instance, the smile of an infant, a funeral train, a number of men and horses traversing the Pont Neuf. Among those exhibited, some were remarkable for their size, and others for their picturesque beauty.—*Comptes rendus, t. xv. p. 345.*

ART. XIX.—*An Introduction to Chemistry.* By G. SPARKES, late Madras Civil Service. Whittaker and Co. Pp. 88.

ONE of the very best of those little works, which lead the inquisitive mind to a consideration of the facts developed by chymistry. The author, "by advancing from things known to things unknown," renders the acquisition of the truths he narrates easy, while they assume an interest which excites in the young student a desire to obtain further insight of the delightful pursuit, which its magniloquent title of Scientific Chymistry had almost deterred him from pursuing. Druggists, who have neglected their chymical information, will thank us for recommending a perusal of its contents, with its explanations of oxides, protoxides, deutoxides, sesquioxides, peroxides, &c. &c.

ART. XX.—*Method of Preparing a very Beautiful and Permanent Red Ink.*

IT is well known that a solution of carmine in caustic ammonia gives a fluid of a very beautiful tint. The author of this paper recommends the following proportions:—

|                     |   |   |   |            |
|---------------------|---|---|---|------------|
| Pure Carmine        | . | . | . | 12 grains. |
| Solution of Ammonia | . | . | . | 3 ounces.  |

Place the carmine in a porcelain vessel; pour thereon the solution of ammonia; heat over a spirit lamp for a space of 5 to 8 minutes, carefully managing the temperature so as not to boil; and to the solution thus formed add, continually stirring—

|                     |   |   |   |            |
|---------------------|---|---|---|------------|
| Powdered Gum Arabic | . | . | . | 18 grains. |
|---------------------|---|---|---|------------|

When dissolved, the ink is ready for use. After using, the inkstand must be well closed. Instead of using carmine, which is expensive, drop lake (being a mixture of carmine precipitated with alum), may be employed, since the ammonia redissolves the carmine therefrom, and leaves the alumina.—*Buchner's Repert.*

ART XXI.—*New Blue Ink, prepared with Prussian Blue.*

IT has only been lately ascertained what substances are capable of dissolving Prussian blue. It has been discovered that oxalic acid is capable of effecting this. In order to prepare this ink, six parts of pure Prussian blue must be carefully triturated with one part of oxalic acid and a little water, so as to form a very fine paste, perfectly free from grittiness; this paste is then diluted with distilled or rain water, until the proper tint is obtained, which may be ascertained by writing on paper with a quill pen: a little gum may be added to prevent the solution from running.—*Mohr.*

| NOMINA.                         | FORMULÆ.                                                            |
|---------------------------------|---------------------------------------------------------------------|
| <i>Acidum</i> Cyanicum. . . . . | $\dot{\text{C}}\text{y}_3=\text{N}_3\text{C}_3\text{O}$ . . .       |
|                                 | $\dot{\text{C}}\text{y}_3^s$ . . . . .                              |
|                                 | $\dot{\text{C}}\text{y}_3^s$ . . . . .                              |
| — Cyanuricum. . . . .           | $\bar{\text{C}}\text{n}=\text{N}^s\text{C}^s\text{H}^s\text{O}^s$ . |
|                                 | $\bar{\text{C}}\text{n}^s$ . . . . .                                |
|                                 | $\bar{\text{C}}\text{n}^s$ . . . . .                                |
| — Formicum. . . . .             | $\bar{\text{F}}=\text{H}^s\text{C}^s\text{O}^s$ . .                 |
|                                 | $\bar{\text{F}}^s$ . . . . .                                        |
|                                 | $\bar{\text{F}}^s$ . . . . .                                        |
| — Fulminicum. . . . .           | $\dot{\text{C}}\text{y}_3$ . . . . .                                |
|                                 | $\dot{\text{C}}\text{y}_3^s$ . . . . .                              |
|                                 | $\dot{\text{C}}\text{y}_3^s$ . . . . .                              |
| — Gallicum. . . . .             | $\bar{\text{G}}=\text{H}^s\text{C}^s\text{O}^s$ . .                 |
|                                 | $\bar{\text{G}}^s$ . . . . .                                        |
|                                 | $\bar{\text{G}}^s$ . . . . .                                        |
| — Hydrobromicum. . . . .        | $\text{HBr}$ . . . . .                                              |
|                                 | $\text{H}_3\text{Br}_3$ . . . . .                                   |
|                                 | 2 . . . . .                                                         |
|                                 | 3 . . . . .                                                         |
| — Hydrochloricum. . . . .       | $\text{HCl}$ . . . . .                                              |
|                                 | $\text{H}_3\text{Cl}_3$ . . . . .                                   |
|                                 | 2 . . . . .                                                         |
|                                 | 3 . . . . .                                                         |

| PONDERA ATOMORUM. |                    | PARTES CENTESIMALES.           |                        |                      |
|-------------------|--------------------|--------------------------------|------------------------|----------------------|
| O = 100           | H <sup>a</sup> = 1 | + E                            | — E                    | H vel H <sup>a</sup> |
| 429,91            | 34,45              | NC=76,74<br>N=41,10            | O = 23,26<br>O = 23,26 | C = 35,56            |
| 859,82            | 68,90              |                                |                        |                      |
| 1289,73           | 103,35             |                                |                        |                      |
| 813,59            | 65,19              | NC=60,83<br>N=32,64<br>C=28,19 | O = 36,87              | H = 2,30             |
| 1627,17           | 130,39             |                                |                        |                      |
| 2440,75           | 195,58             |                                |                        |                      |
| 465,35            | 37,29              | C=32,85                        | O = 64,47              | H = 2,68             |
| 930,71            | 74,58              |                                |                        |                      |
| 1396,06           | 111,87             |                                |                        |                      |
| 429,91            | 34,45              | NC=76,74<br>N=41,18            | O = 23,26<br>O = 23,26 | C = 35,56            |
| 859,82            | 68,90              |                                |                        |                      |
| 1289,73           | 103,35             |                                |                        |                      |
| 1072,50           | 85,94              | C=49,89                        | O = 46,62              | H = 3,49             |
| 2145,00           | 171,88             |                                |                        |                      |
| 3217,50           | 257,82             |                                |                        |                      |
| 495,39            | 39,70              | H=1,26                         | Br = 98,74             |                      |
| 990,79            | 79,39              |                                |                        |                      |
| 1981,57           | 158,79             |                                |                        |                      |
| 2972,36           | 238,18             |                                |                        |                      |
| 227,57            | 18,23              | H=2,74                         | Cl = 97,26             |                      |
| 455,13            | 36,47              |                                |                        |                      |
| 910,26            | 72,94              |                                |                        |                      |
| 1365,39           | 109,41             |                                |                        |                      |

| NOMINA.                                         | FORMULÆ.                                                           |
|-------------------------------------------------|--------------------------------------------------------------------|
| <i>Acidum</i> Hydrocyanicum. . . .              | HCy . . . . .                                                      |
|                                                 | H <sub>2</sub> Cy <sub>2</sub> . . . . .                           |
|                                                 | 2 . . . . .                                                        |
|                                                 | 3 . . . . .                                                        |
| — Hydrofluoricum. . .                           | HF . . . . .                                                       |
|                                                 | H <sub>2</sub> F <sub>2</sub> . . . . .                            |
|                                                 | 2 . . . . .                                                        |
|                                                 | 3 . . . . .                                                        |
| — Hydrofluoboricum. . .                         | H <sub>2</sub> F <sub>2</sub> + 3BF <sub>3</sub> . .               |
| — Hydrofluosilicicum. . .                       | H <sub>2</sub> F <sub>2</sub> + 2SiF <sub>4</sub> . .              |
| — Hydrojodicum. . . . .                         | HJ . . . . .                                                       |
|                                                 | H <sub>2</sub> J <sub>2</sub> . . . . .                            |
| — Hydrojodicum. . . . .                         | 2 . . . . .                                                        |
|                                                 | 3 . . . . .                                                        |
| — Hydrosulphocyanicum. .                        | HCyS . . . . .                                                     |
|                                                 | H <sub>2</sub> Cy <sub>2</sub> S <sub>2</sub> . . . . .            |
|                                                 | 2 . . . . .                                                        |
|                                                 | 3 . . . . .                                                        |
| — Hydrosulphocyanicum. }<br>hydrosulphuratum. } | H <sub>2</sub> Cy <sub>2</sub> S <sub>2</sub> + H <sub>2</sub> . . |

| PONDERA ATOMORUM. |                    | PARTES CENTESIMALES. |          |                      |
|-------------------|--------------------|----------------------|----------|----------------------|
| O = 100           | H <sub>2</sub> = 1 | + E                  | — E      | H vel H <sub>2</sub> |
| 171,20            | 13,72              | H=3,64               | Cy=96,36 |                      |
| 342,39            | 27,44              |                      |          |                      |
| 684,78            | 54,87              |                      |          |                      |
| 1027,27           | 82,31              |                      |          |                      |
| 123,14            | 9,87               | H=5,07               | F=94,93  |                      |
| 246,28            | 19,73              |                      |          |                      |
| 492,56            | 39,47              |                      |          |                      |
| 738,84            | 59,20              |                      |          |                      |
|                   |                    | H, F,                | BF,      |                      |
| 1356,30           | 108,68             | 18,16                | 81,84    |                      |
|                   |                    | H=0,92               | F=68,95  | B=30,13              |
|                   |                    | H, F,                | Si F,    |                      |
| 1268,50           | 101,65             | 19,42                | 80,52    |                      |
|                   |                    | H=0,98               | F=55,30  | Si 43,72             |
| 795,99            | 63,78              | H=0,78               | J=99,22  |                      |
| 1591,98           | 127,57             |                      |          |                      |
| 3183,96           | 255,13             |                      |          |                      |
| 4775,94           | 382,70             |                      |          |                      |
| 372,36            | 29,84              | Cy=44,30             | S=54,02  | H=1,68               |
|                   |                    | N=23,77              |          |                      |
|                   |                    | C=20,53              |          |                      |
| 744,72            | 59,68              |                      |          |                      |
| 1489,44           | 119,35             |                      |          |                      |
| 2234,16           | 179,03             |                      |          |                      |
|                   |                    | H, Cy, S,            | H,       |                      |
| 958,36            | 76,79              | 77,71                | 22,29    |                      |
|                   |                    | N=18,48              |          |                      |



## MEETING OF THE PHARMACEUTICAL SOCIETY.

A **VERY** full meeting of the Pharmaceutical Society took place on Wednesday evening. Mr. Payne in the chair.

The first paper read was by M. Guibourt on a species of convolvula with a rose odour, with which some bales of jalap received at Paris had been adulterated. M. G. had undertaken some experiments with a view to the quantitative analysis of this as well as the true jalap root, the result of which will be printed in detail in the Society's Transactions. The discordance between the present analyses of jalap were pointed out, as also the precautions to be observed to prevent the article noticed from entering into circulation, whose remedial effects were not at all equal to the true jalap.

A paper by Dr. Pereira was then read, on the distinctive characters of the fruits (usually termed seeds) of anise, hemlock, and fool's parsley; having been suggested in consequence of a case of poisoning reported in a French journal.

The next paper was by Dr. Clark, formerly of Sierre Leone, on the Talicoonha or Kundh oil, used at the colony of Sierre Leone as an anthelmintic. From the particulars given, it would appear to be an exceedingly nauseous if not dangerous remedy.

We were pleased to observe among those present Dr. Ure and his son, Mr. A. Ure, also Prof. Mitscherlich, of Berlin, besides the most active supporters of this useful Society.

## NOTICES TO CORRESPONDENTS.

J. E., Clifton—The following is a good formula:—

## AROMATIC VINEGAR.

|                            |            |
|----------------------------|------------|
| Glacial Acetic Acid        | 8 ounces.  |
| Essential Oil of Rosemary  | 20 grains. |
| „ „ Bergamot               | 15 „       |
| „ „ Lavender               | 9 „        |
| „ „ Cloves                 | 24 „       |
| „ „ Cinnamon               | 20 „       |
| „ „ Orange Flower (Neroli) | 4 „        |
| S. V. R.                   | 2 drachms. |

CHYMICUS, Brighton.—The formula of the British Eau de Cologne is as follows; and we have to observe, that if the Spirits of Wine be perfectly clean, and the Oil of Neroli of *first quality*, it is quite equal to any that can be imported:—

|                   |       |
|-------------------|-------|
| B. Ess. Bergamot: | ℥40   |
| „ Limon.          | 45    |
| Oil Rorismar.     | 6     |
| „ Aurantii        | 22    |
| „ Neroli Opt.     | 12    |
| S. V. R.          | ℥5vj. |

M. P. S., Newcastle.—Subjoined are the formulæ of Messrs. ALLEN, HANBURY, and BARRY, of Plough Court:—

## SUCCUS LIMONUM.

|                        |            |
|------------------------|------------|
| B. Acid. Citric Cryst. | 3ij gr. 33 |
| Aq. Distill.           | 3v.        |
| Ol. Limonis.           | gtt. j     |
| S. V. R.               | ℥3 ij.     |

M. fiat solutio.

## STYRUPUS LIMONUM.

|                     |          |
|---------------------|----------|
| B. Succ. Limonum    | Oj.      |
| Acid Citric. Cryst. | 3ij. r   |
| Aq. Distill.        | O2       |
| Sacch. Alb.         | lb. 5 H. |

Solve o. a.

\*. \* *Communications, Books for Review, &c. are requested to be addressed*—“To the Editors of the ANNALS OF CHYMISTRY, care of Messrs. Longman, Brown, and Co. Paternoster Row.”

WILSON AND OGILVY, 57, SKINNER STREET, SNOWHILL, LONDON.

THE  
ANNALS OF CHYMISTRY  
AND  
PRACTICAL PHARMACY.

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No. 4.]      FRIDAY, OCTOBER 21, 1842.      [Vol. I.

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SALE OF POISONS.

MOST of our readers are aware that the sale of poisons upon the continent is limited by severe laws, the infraction of which is visited by heavy penalties. The punishment does not hang over the head of the offenders, like the sword of DAMOCLES, terrific but inactive; for the law is neither obsolete nor obsolescent. Let us cite a few instances of its activity in France. A woman, wishing to commit suicide, bought an acid preparation of Prussian blue. She swallowed it, but her life was saved by judicious treatment. Still, the grocer who sold it to her was fined 3000 francs (£120.) for vending it without observing the forms decreed by the law of the 21 Germinal of the year XI. (*Journal de Chimie Médicale*, March 1842.)

In the same number of the same journal we find an account of another grocer condemned to an equal penalty. He had sold *eau seconde* by mistake instead of vinegar; and a lady having eaten some salad made with it was attacked with general weakness and indisposition, which had not gone off when the trial took place.

It seems that two different preparations are known by the name of *eau seconde*; the one being a solution of potash, the other a mixture of equal parts of commercial nitric acid and water. In the opinion of the editor of the *Journal de Chimie Médicale* neither of these preparations could have been used in this instance, as either one would have given the salad so marked a flavour that it would have been uneatable; while it was deposited that the salad in question was flat and tasteless.

In a third instance, a *pharmacien* was fined 3000 francs for

having sold a nursery-maid some poisonous pills with which she committed suicide. (*Journ. de Chim. Méd.* Sept. 1842.)

In Belgium the law is similar, though the fines are smaller. Apothecaries are bound to keep poisons, such as white or black arsenic, corrosive sublimate, and opium, safely locked up in a place of which they alone have the key. Poisons are not to be given to any one without an order written and signed by a doctor of medicine, surgeon, accoucheur, apothecary, or some well-known person, and with directions to be employed for some known purpose, under a penalty of 100 florins, (£8. 6s. 8d.) to be doubled on each repetition of the offence. These directions must be preserved, under a penalty of 50 florins.

If an apothecary discovers, or suspects, that there is an error in a prescription, he is bound to go to the physician or surgeon who wrote it in order to learn his intentions, but is not to correct the suspected error of his own accord.

Even the stringent laws of France, however, are not sufficiently rigorous for M. Cormenin, who proposes to forbid arsenic to be sold by retail under any circumstances. Medicine, he says, has derived no real advantage from it; and householders, instead of using arsenic, might stop up the holes in their walls more carefully. Nor would he allow it to be sold wholesale, excepting to licensed and well-known manufacturers, furnished with a certificate from the mayor, and a written declaration.

From this extreme of rigour, come we now to the other extreme of laxity, and let us see how matters are managed at home.

About a month ago, a medical practitioner in London, being in attendance on a lady suffering from inflammation of the stomach and bowels, ordered her to take a table-spoonful of potash-water, diluted with an equal quantity of milk. The servant went to a neighbouring chymist, and procured an ounce of *liquor potasse*, which was labelled "potash-water." Half an ounce of this was administered to the patient, who immediately exclaimed, "You have poisoned me; I am all on fire!" and appeared to be in great pain. The lady survived a fortnight; and, on a *post-mortem* examination, extensive disease of the stomach was found, as well as hemorrhage in the brain. How much of this may have been caused by the potash it is utterly impossible to

determine; but it is probable that the caustic accelerated her death, in spite of the immediate use of the stomach-pump and appropriate antidotes.

Another most important question remains, How should the blame incurred be divided among the parties concerned?

The practitioner, it seems, told the patient's sister that the remedy was an effervescing beverage like soda-water, and offered to write down the name, but she said that this was unnecessary. The servant, when questioned by the druggist, did not know for what purpose the remedy was required. The druggist, again, appears to have given the medicine without any other warning but his question. The friends of the patient were not struck by the want of effervescence in the solution. On the whole, this catastrophe seems to have been one of those tragic incidents, where a single word would have been safety, but where that word was wanting.

Had the practitioner, for example, recollected the dangerous similarity of names between potash-water (the effervescent), and *aqua potassæ* (the caustic), as it is called in the Edinburgh Pharmacopœia, he would have written down the name. Had the servant known that the remedy was to sparkle like soda-water, or that the dose was to be a table-spoonful, the chymist would have been guided. Had he put upon the phial the word "Poison," or the direction, "Dose from ten to fifty drops," the patient would have been warned. Had the patient, disquieted by the non-effervescence of the remedy, or the slender dimensions of the phial, sent a note of inquiry to the druggist (scarce three minutes' walk), again the course of events would have been different.

If the effervescing potash-water were considered as on a footing with soda-water, as a popular beverage, without reference to the dangerous confusion of nomenclature in the case of potash, there would be no pressing reason for writing down its name. As the matter stands, however, it is not merely expedient, but necessary; at least we see this now, after the event.

It would, no doubt, be a great improvement in practice, if directions concerning diet and *tisanes* were given in writing, like ordinary prescriptions; and in the entertaining work called "The Gold-headed Cane," Dr. MACMICHAEL praises the French

physicians for this very point, and gives an example of a dietetic prescription.

Finally, without imitating the rigour of continental codes, it would be highly useful to draw up some regulations concerning the sale of poisons. These should emanate, in the first instance, from the College of Physicians, or the Pharmaceutical Society, and might be recommended, rather than enjoined; and when tested by experience, might be confirmed by legislative enactment.

## CHYMISTRY, OPERATIVE AND EXPERIMENTAL.

ART. II.—*On the Analysis of Orgall, and the Characteristic Properties of its Elements.* By the Baron J. BERZELIUS.

[From the Kongl. Vet. Acad. Handl.]

[Continued from page 71.]

THESE experiments gave rise to those instituted by myself, and the results of which I now intend to communicate. They proved that gall contains a peculiar substance, soluble in water, spirit of wine, acids, and alkalies, which I termed bilin, and which, in Gmelin's gall-sugar, is combined with a salt of soda. I found that the choleic acid (*acide choleique*) of Demarçay (the gall substance obtained by myself in the year 1806), was an acid body, which combined with bases, as Demarçay had stated. I found, however, that at least two acids were contained therein, and in old gall even four or five, four of which appertain to the class of bibasic acids, and are combinations of bilin with peculiar acids, and such that bases do not separate the bilin therefrom, but that this enters into the composition of their salts in certain proportions. In fresh gall I discovered chiefly two acids, which I termed fellic acid and choleic acid, and their combinations with bilin, bilifellic and bilicholic acids. In old gall I found, besides choleic acid, two other acids previously unknown, fellanic acid and cholanic acid—the two former of which also possess the property of producing with bilin, bibasic acids. The metamorphosis which Demarçay observed in reference to that acid, which he terms *acide choleique*, occurs in bilin, which is firstly converted by acids into bilifellic and bilicholic acid, and afterwards into a mixture of fellic and cholic acids, which, by the further continued action of acids, pass into a peculiarly indifferent body incapable of combining with alkalies, and nearly insoluble in spirit of wine: by such action, then, a body is formed, which, from its insolubility in spirit of wine, and its indifference towards alkalies, I have termed *dyslynin*.

After this short account of the chymical history of gall, I will now explain the method by which I succeeded in separating the component parts of gall from each other.

### 1. FRESH GALL.

After removal from the gall-bladder it was filtered through linen, in order to separate from it the quantity of mucus which is always suspended therein, and which causes it to form threads when poured from one vessel to another. This mucus remains on the filter; but a certain portion of it, which is perfectly dissolved in the gall, passes through at the same time, without, however, causing the gall to assume a stringy appearance. The first operation has merely for its aim the separation of this mucus, and, like albumen, of which it is probably the raw material, it possesses the property of existing in two different conditions; that is to say, either uncoagulated or coagulated, in which latter state it is not dissolved in the gall. It may be coagulated by alcohol and acids, but not by boiling.

For this purpose both substances may be used. Alcohol is, however, to be preferred, for these reasons:—because it may easily be removed by evaporation; neither does it tend, like acids, to produce changes in the fluid under examination. If an acid be used, it is immaterial which is selected: acetic acid perhaps is preferable, for these reasons:—that it may be removed in the same way as alcohol, by evaporation; and, besides, it contributes little or nothing to the decomposition of the gall.

For most of my experiments I have selected alcohol. The gall is mixed with an equal volume of alcohol, 0.833 specific gravity, by which the mucus is coagulated. A clear and filtered sample is then tested, to ascertain if it be necessary to add more alcohol; and, if the mucus has been entirely precipitated, the mixture is filtered, and the precipitate washed with alcohol of 0.90 specific gravity. It is true that mucus is insoluble in water, but if washed therewith it becomes gelatinous; wherefore the use of water in washing it should be avoided. In one of my experiments, mucus, which had previously been washed and dried at  $+ 100^{\circ} = 212^{\circ} \text{ F.}$ , was weighed; it gave 0.231 of one per cent. of the gall, and left 0.026 of bone-earth, which dissolved in muriatic acid, without the least evolution of carbonic acid.

The liquid, after having undergone precipitation by alcohol, is evaporated to dryness in a water-bath, and then further concentrated by placing the capsule in an oil-bath of  $+ 130^{\circ} = 266^{\circ} \text{ F.}$ , by which it is inflated to a yellow vesicular mass, deprived of water, and is then easily rubbed to powder, which is best done in the same vessel, after having been perfectly cooled. This powder is put into a dry bottle as quickly as possible, and then ether, absolutely free from water and alcohol, poured over it; if otherwise, the powder liquefies into an extract. The ether is

then decanted, and the remaining drops of ethereal solution are repeatedly rinsed with pure ether. Ether extracts the cholesterine which remains in a crystalline form after distillation of the ether, contaminated only with a minute portion of the fatty oil of the gall. According to one of my experiments, in which it was weighed, it amounted to 0.016 of one per cent. of the gall-powder employed.

A portion of the same gall was, without previous separation of the mucus, evaporated in a platina crucible, and then dried in an oil-bath at  $+130^{\circ} = 266^{\circ} \text{ F.}$ , till its weight ceased to be diminished; after which 7.162 per cent. of solid substances remained. The weight of the cholesterine amounted, therefore, in this experiment, to only  $\frac{1}{61.777}$  of the weight of gall employed.

If the separation of cholesterine is not especially requisite, this roundabout process may be dispensed with. The gall is then dried in a water-bath until it remains perfectly hard when cold; it must then be dissolved in anhydrous alcohol, the undissolved parts removed by filtration, and washed with anhydrous alcohol, under a well closed glass-bell, in order that the alcohol may not absorb humidity from the atmosphere; and this washing is to be continued until the alcohol passes colourless, and without dissolving any part of the substance.

We shall first direct our attention to the treatment of the undissolved residue, and then return to the filtered liquid.

The *residue on the filter* is washed with warm or boiling alcohol of 0.833 sp. gr. until it passes through uncoloured, and the cold yellow solution is mixed with anhydrous alcohol until pale yellow flocculi cease to be produced in it by further addition. This precipitate is bilifulvin, which is collected on a filter, and then cleaned by washing with anhydrous alcohol.

It sometimes happens that the anhydrous alcohol employed for washing the undissolved portions on the filter begins to assume a yellow colour, and to depose bilifulvin when dropped into the solution of alcohol already passed through; this bilifulvin must then be separated by filtering it, and washed on the filter with a little anhydrous alcohol. By this process it is obtained in the purest state.

The liquid, after having undergone precipitation with anhydrous alcohol, is still of a yellow colour, produced by a yellow substance analogous to the extractiform matter of the juice of flesh, which is soluble in alcohol. This remains after the alcohol has been removed by distillation. With acetate of lead it yields a pale yellow precipitate, containing some bilifulvin. With diacetate of lead it yields a slightly-coloured precipitate, and this leaves, on separation of the oxide of lead by sulphuretted hydrogen and evaporation, a peculiar animal matter, which has altogether so great an analogy to the corresponding substances obtained from the juice of flesh, that I did not consider

it necessary to lose time in subjecting it to a closer examination, especially as the quantity is inconsiderable, and in one of my experiments amounted to not more than 0.121 of 1 per cent. of the weight of the fresh gall.

The parts undissolved in alcohol of 0.833 sp. gr. weighed, in one of my experiments, 0.4334 of 1 per cent. of the weight of gall. It contained matters precisely analogous to those which we call aqueous extract of flesh.

The component parts of gall dissolved in anhydrous alcohol are, whilst the solution is concentrated, of a greenish-yellow colour. By the addition of alcohol, however, which is required for the purpose of washing the undissolved portions, it assumes a yellowish-red colour. The solution is then mixed with barytic water, added drop by drop, and agitated with it. This produces a precipitate which has a dirty greyish-yellow appearance at first, but soon becomes green. Barytic water precipitates bilifulvin, biliverdin, and stearic acid during this operation. The biliverdin has the greatest affinity for the barytic earth, which produces the change of colour observed. If the green precipitate is separately collected, it will be found to be a mixture of stearate and biliverdate of barytes. If the addition of barytes is continued, the precipitate soon assumes a pale yellow tint without changing colour; and, lastly, before the water of barytes has ceased to induce precipitation, the precipitate becomes of a greyish-white colour in consequence of the basic barytic salts of the fatty acids.

The liquid precipitated by barytic water is almost colourless after standing, having merely a very slight yellow tinge, occasioned by that portion of the extractive of flesh which dissolves in anhydrous alcohol, and cannot be separated.

The precipitate of barytes is washed with anhydrous alcohol, and then digested with carbonate of ammonia, which extracts the colouring matter, leaving behind carbonate of barytes, to which a small quantity of biliverdate and stearate of barytes are attached.

The ammoniacal solution is evaporated to dryness in a water-bath; the mass dissolved in water. The dissolved portion is bilifulvin. Those undissolved, a mixture of biliverdin and stearic acid.

The carbonate of barytes decomposed by muriatic acid leaves stearic acid, contaminated with biliverdin.

If the barytic precipitate is boiled with carbonate of soda, and the liquid filtered whilst boiling-hot, a gelatinous mass is obtained on cooling, which consists of bistearate of soda. This may be stirred with water, by which operation the other substances pass dissolved, although not perfectly free from stearate of soda.

[To be continued.]



ART. III.—*Simple means of accurately distinguishing Racemic or Paratartaric from Tartaric Acid, by means of their respective Thermoelectric Properties.*

If a crystal of tartaric acid be held by means of platina tongs, and one end thereof gently heated in the flame of a spirit lamp, and then brought into immediate contact with the plate of an electroscope, very distinct indications of electricity will be observed. Racemic acid, under similar circumstances, is perfectly indifferent. Sugar of milk also, when heated in the above manner, gives indications of polarity, although in a less degree than sugar candy.—*Boettger's Beiträge.*

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ART. IV.—*On Sanguinarin.* By Dr. T. SCHIEL.

ACCORDING to Dohna, sanguinarin is obtained from the root of *Sanguinaria Canadensis*, of the family *Papaveraceæ*, by digesting the root in anhydrous alcohol, and mixing the solution with water and ammonia, which produces a red precipitate, which is then washed and boiled with water and animal charcoal. After the water has been removed, the base is separated from the animal charcoal by alcohol, filtered, and the alcohol distilled, leaving the base behind, a pearl-grey substance.

It is, however, better to employ the following method for the production of sanguinarin, being that which Probst followed for producing chelerythrin from *chelidonium majus*, and which appears to be identical with sanguinarin\* :—

The dried pulverised root is digested in ether; and, after filtration, a current of muriatic acid gas is passed through the latter, causing some impure muriate of sanguinarin to be precipitated, which is removed from the ether by filtration. The muriatic salt, after being dried at a gentle temperature, is dissolved in hot water, and mixed with ammonia in excess. The precipitate thus obtained is washed on a filter, then dried, and dissolved in ether. The ethereal solution is shaken with fresh-burnt animal charcoal, until, after deposition of the charcoal, the liquid appears quite colourless. Into the filtered solution a current of muriatic acid gas is passed, which causes a beautiful scarlet-red precipitate of pure muriate of sanguinarin. Ammonia precipitates pure sanguinarin from the aqueous solution of this salt, in the form of white, or slightly yellow (flesh-coloured), flakes, which, after being washed and dried, have the appearance of a yellow coherent powder.

Another advantageous process is, to digest the root in water

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\* The production of chelerythrin from *chelidon. maj.*, in the way mentioned, was the last work of Probst; his illness so quickly increasing did not allow him to furnish any details respecting it.

containing sulphuric acid, and to precipitate the sanguinarin from the filtered liquid by ammonia. After being washed and dried it is dissolved in ether, the ether removed by filtration from the undissolved portions, and the treatment of the filtered solution with animal charcoal, &c. continued as above stated.

By the first method of preparation a small quantity of sanguinarin, with some brown resinous matter, remains dissolved in the ether after the first precipitation with muriatic acid gas. This may be separated by removing the ether by distillation, and separating the sanguinarin from the resin by means of hot water containing sulphuric acid, and afterwards precipitating it by ammonia.

Sanguinarin is a brittle, yellow, and tasteless powder, which instantly excites sneezing, and in an atmosphere containing a small quantity of acid vapours immediately assumes a red colour. It is insoluble in water, but easily dissolved in alcohol and ether. The alcoholic solution has a strongly bitter taste, and an evidently alkaline re-action. Heated, it melts into an oily liquid, and burns without residue. Acids are completely neutralized by it; and it forms with them red salts, which are easily soluble in water, and of an intensely bitter taste. Chloride of platina precipitates them of an orange-red colour. Infusion of galls also precipitates them of a yellowish-red colour. Concentrated sulphuric acid decomposes sanguinarin.

I have not yet been able to institute experiments as to the effects of the salts of sanguinarin on the animal organism, as I had used all the material I possessed, for analysis. I intend, however, to do this as soon as I have obtained a fresh supply. It cannot be doubted that these salts will furnish very effective remedies.

The combustion of oxide of copper gave the following composition for sanguinarin :—

0.2245 grains of sanguinarin, dried at  $100^{\circ} = 212^{\circ} \text{F.}$ , gave 0.5741 carbonic acid, or 70.03 per cent. carbon, and 0.1067 of water = 5.27 per cent. of hydrogen.

0.2542 grains gave 0.6498 of carbonic acid = 70.02 per cent. carbon, and 0.1168 of water = 5.14 per cent. of hydrogen.

0.225 grains gave 0.566 of carbonic acid = 69.82 per cent. of carbon, and 0.102 of water = 5.08 per cent. of hydrogen.

By determining the azote according to the method of Varrentrapp and Will, 0.3439 grs. of the substance gave 0.2839 of platina muriate of ammonia, = 5.23 per cent. of azote.

Sanguinarin, therefore, consists in 100 parts of—

|                    | I.          | II.         | III.  |
|--------------------|-------------|-------------|-------|
| Carbon . . . . .   | 70.03 . . . | 69.82 . . . | 70.02 |
| Hydrogen . . . . . | 5.27 . . .  | 5.08 . . .  | 5.14  |
| Azote . . . . .    | 5.23        |             |       |
| Oxygen . . . . .   | 19.47       |             |       |

The atomic weight was defined from the combination of muriate of sanguinarin with chloride of platina.

0.4741 of this salt left under heating 0.0885 of platina, which gives for its atomic weight 4034. The composition of sanguinarin is expressed by the following formula:—

|                            | In 100 parts. |        |
|----------------------------|---------------|--------|
| 37 at. of Carbon . . . . . | 2806.45       | 70.62  |
| 32 „ of Hydrogen . . . . . | 190.00        | 4.78   |
| 2 „ of Azote . . . . .     | 177.03        | 4.45   |
| 8 „ of Oxygen . . . . .    | 800.00        | 20.15  |
| <hr/>                      |               |        |
|                            | 3973.48       | 100.00 |

This formula agrees better than any other with the composition found by analysis: I am, however, unable to state if it is the exact one. I am bound to add, that two other experiments gave numbers which differed considerably from that proposed above. 0.2923 of salt of platina gave 0.0634 of platina, whence follows the atomic weight 4334; a further analysis of 0.6195 grs. of salt of platina gave 0.1075 of platina, fixing the number of atomic weight at 4534.5.

*Muriate of Sanguinarin.*—The muriate of sanguinarin is a coherent red mass, which easily crumbles between the fingers. Examined under a microscope, the powder appears composed of agglomerated masses of perceptibly minute crystals. It dissolves easily in water and alcohol, especially when heated; it is, however, insoluble in ether.—*Liebig's Annalen.*

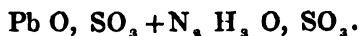
#### ART.VI.—*Double Salt of Sulphate of Lead with Sulphate of Ammonia.*

SULPHATE of lead may be dissolved in considerable quantity in a solution of sulphate of ammonia, especially if it is concentrated, and at a high temperature. This depends on the formation of a double salt, which deposits in small crystals whilst cooling. The simplest way of obtaining it is as follows:—A slightly concentrated solution of acetate of lead is precipitated with diluted sulphuric acid, added to excess, and the acid is neutralized with ammonia, and heated almost to boiling, during which time the precipitate is perfectly dissolved. If this does not succeed, it is only because the sulphate of ammonia has not been added in sufficient quantity; if, then, the solution does not deposit crystals on cooling, it must be again heated, and sulphuric acid gradually added till it begins to grow turbid. It would

appear, moreover, that the salt is formed with peculiar facility in a fluid containing acetate of ammonia.

This double salt forms, indeed, only small crystals, but they are sharp, glittering, and transparent. It is not dissolved by water, but decomposed. If water be poured on the crystals, they instantly assume a milk-white colour, and melt into sulphate of lead, while the sulphate of ammonia is dissolved. Whilst operating, the salt must not be washed with water.

When heated, it is decomposed into sulphate of lead and sulphite of ammonia, which sublimes. It contains no water of crystallization. According to the analysis of Mr. Litton, it consists of 1 atom of sulphate of oxide of lead, and 1 atom of sulphate of oxide of ammonium.



1.256 grammes of double salt yielded, by decoction with water, 0.869 of sulphate of lead=69.2 per cent.

From the filtered fluid 0.671 of sulphate of barytes were obtained by chloride of barium, answering=0.381 of sulphate of oxide of ammonium=30.3 per cent. 1.890 of the double salt, when heated to redness, yielded 1.321 of sulphate of lead=H69, 8 per cent.

According to the above formula, the salt must contain 69.60 per cent. of Pb O, SO<sub>3</sub> and 30.40 per cent. of N<sub>3</sub>H<sub>3</sub>O, SO<sub>3</sub>.—*Ibid.*

ART. V.—*On a new Combination of Platina—Sesqui-platino-cyanide of Potassium.* By KNOP.

THE action of chlorine on a solution of ferro-cyanide of potassium discovered by L. Gmelin, by which the salt is converted into the beautiful red sesquicyanide, led to a presumption that the double cyanides of other metals would yield analogous results; whence the production of new combinations might be anticipated. At the suggestion and under the direction of Professor Woehler, I have undertaken a series of experiments in reference to this subject, beginning with platino-cyanide of potassium. This salt reacts precisely as the double ferro-cyanide. It is changed, by the action of chlorine, into sesqui-platino-cyanide of potassium, the formation and properties of which I am now about to describe.

I prepared the material for this research—the platino-cyanide of potassium first produced by L. Gmelin—some by the well-known method of heating spongy platina to redness with prussiate of potash, and some by another method, which I considered as more advantageous on account of the certainty of the product. It is this: a chloride is prepared by heating chlorine with

platina, which is then dissolved in a recently prepared concentrated solution of cyanide of potassium in such proportion that some chloride remains undissolved, and, therefore, no free cyanide of potassium is left in the solution, which is then filtered, evaporated, and set aside to crystallize, by which method the double cyanide is obtained without difficulty in sufficient quantity and perfectly pure.

In order to convert this salt into the sesquicyanide, a solution is prepared at a high temperature, and sufficiently saturated to cause a deposition of crystals on cooling. Chlorine gas is introduced into this solution, which speedily causes the formation of fine copper-coloured crystalline needles, whose number rapidly increases, so that the whole liquid soon congeals into a copper-red magma. As soon as this is the case, the introduction of chlorine is discontinued, since, under its continued action, the newly-formed compound would be again decomposed. The whole mass is then placed on a funnel, the removal of the mother liquor being assisted by gentle pressure, and the mass is, at last, compressed to dryness between folded bibulous paper. The salt is very soluble, and must therefore not be washed with water, neither with alcohol, since the spirit causes a precipitation in the mother liquor. For the purpose of effecting its complete purification, it is next repeatedly dissolved in the least possible quantity of hot water, to which a few drops of muriatic acid have been added, in order to saturate the adhering cyanate or carbonate of potassa, which would reduce the sesquicyanide into cyanide.

Sesquiplatino-cyanide of potassium is one of the most beautiful salts produced by modern chymistry. It forms fine prisms, having a rich copper red colour of metallic lustre. Examined in the mass it resembles a metallic felt composed of fine copper needles; with a microscope of power capable of magnifying fifty times their real size, the crystals will be observed to consist of flat quadrangular prisms, and by causing light to pass through them they appear of a pale green colour, and transparent. This transparency may be seen in the sun's light by the naked eye, without the assistance of a magnifying glass.

This salt dissolves in water with facility, forming a colourless solution; and if evaporated until crystals form, this singular phenomenon is perceived—a red coloured body, glittering like metal, separating from a colourless liquid. It is insoluble in alcohol.

Salts of copper produce in the solution a greenish white precipitate; those of silver and the peroxide of quicksilver a white, and the salts of protoxide of silver a dark blue precipitate.

Digested with a solution of carbonate of potassa, it is reconverted into cyanide. Hot concentrated sulphuric acid decomposes it, disengaging a yellow pulverulent body, which, by

heating to redness, evolves cyanogen, and leaves a residue containing platina and potassium. By the action of cold concentrated muriatic acid, the salt becomes first orange coloured, and then colourless; but if exposed to heat, it again assumes a copper red hue.

This salt is very easily decomposed by heat. Exposed in vacuo for a short time to the action of sulphuric acid, at ordinary temperatures, it is partially decomposed and blackened, because it loses its water of crystallization, and cannot afterwards be completely dissolved. If heated, it first becomes black, evolving at the same time cyanogen, then yellowish white, and finally it melts into a brown mass.

In order to define precisely the quantity of potassium and platina contained therein, the carefully dried salt was mixed and treated with three times its weight of hydrochlorate of ammonia, which removed all the cyanogen as cyanide of ammonium; whilst a mixture of platina and chloride of potassium was left behind.

I. 1.0 gr. of salt gave 0.7715 residue; consisting of 0.434 of platina, and 0.337 of chloride of potassium.

II. 1.0 gr. of salt gave 0.768 residue; consisting of 0.435 of platina, and 0.331 of chloride of potassium.

The comparative quantities of water and cyanogen were ascertained by combustion with oxide of copper.

I. 0.542 gr. of salt gave 0.059 of water, and 0.23 of carbonic acid in the potash apparatus, and 0.0528 of carbonic acid, which, together with that combined with the potassa left in the tube of combustion, amounted to  $0.2828 = 14.34$  per cent. of carbon  $= 31.0$  per cent. of cyanogen.

II. 0.8055 gr. of salt gave 0.08 of water and 0.341 of carbonic acid in the potash apparatus, and, with 0.0785 of carbonic acid contained in the salt of potassa, amounted together to  $0.4195 = 14.31$  per cent. of carbon  $= 30.9$  per cent. of cyanogen.

These data give the following as its composition:—

|                      | Calculated. | Analysis I.  | Analysis II. |
|----------------------|-------------|--------------|--------------|
| 2 At. of Potassium . | 17.33 . . . | 17.704 . . . | 17.40        |
| 2 — Platina . .      | 43.63 . . . | 43.400 . . . | 43.50        |
| 10 — Cyanogen .      | 29.10 . . . | 31.000 . . . | 30.90        |
| 5 — Water . .        | 9.94 . . .  | 10.800 . . . | 9.93         |
|                      | 100.00      |              |              |

The composition of this sesquiplatino-cyanide of potassium is therefore expressed by the formula—



The excess of cyanogen in the analyses is most likely occa-

sioned by the difficulty of maintaining the salt in a perfect state of dryness without decomposing it; and as the quantity of cyanogen contained in it was calculated from the quantity of carbon ascertained, any error in the latter must have been doubled.—*Liebig's Annalen*.

## CHYMISTRY APPLIED TO AGRICULTURE.

ART. VII.—*On the Nourishment of Plants*. By TH. DE SAUSSURE.

[Continued from page 79.]

AMONG the facts alleged by Professor Liebig, in support of the theory of nutrition of plants by air, water, and salts only, may be mentioned the results which Mr. Lucas obtained with pure charcoal powder, and charcoal mixed with earth.

I shall not occupy myself with the beneficial influence of this mixture\*, since the results which Mr. Lucas obtained by the action of charcoal alone, and according to which earth may be replaced by charcoal in order to ensure beautiful vegetation, are not considered exact†.

The efficiency of dunghill drainings (*eau de fumier*), or muck, with which fields are irrigated, partly consists in the nourishment which it affords by its property of causing fermentation, tending to assist in the decomposition of the insoluble organic matters contained in the earth.

I exposed powdered sifted charcoal, obtained from fir or beech wood, for several days to a stream of water, and I filled some vessels with it. In these I sowed, in the open air, peas, beans, madis, poppies, athanasia annuelle, and flax seed. They were supplied with spring water, with the exception of the beans, which were watered with simple distilled water. By the side of these vessels, on shelves, were placed similar seeds in meadow earth, which had not been manured, and was of a pale grey-yellow colour, and apparently very poor.

All these plants thrived better in the poor earth than in the charcoal. I observed, however, that each bean plant in the latter bore a fertile seed, whilst those in sand and silex produced none. The peas in the sand, and also in the charcoal, yielded but a small quantity of seed; they had slender stalks, with small leaves. The plants in the charcoal were somewhat larger.

\* When I expressed myself in this manner, I was not aware that M. Taume Saint-Hilaire had ascertained, that mixtures of charcoal and vegetable earth are more hurtful than favourable to vegetation.

† These results may be daily observed, on a large scale, in the botanical garden at Ratisbon (Regensburg).—*J. Liebig*.

Having perceived that the charcoal sometimes possesses a slight advantage over pure sand, I subjected pulverized charcoal to a long decoction in distilled water. It assumed towards the end of the evaporation a yellow colour, which was sufficient to indicate the presence of organic matter unperceived in the first washing. The fluid contained also several saline substances, especially ammonia, which had doubtless been condensed in it during [or immediately after] combustion.

It is this property which charcoal possesses of condensing ammonia and carbonic acid which renders it preferable to sand in forwarding the growth of plants.

Dr. Liebig, who attributes the introduction of azote into the plant as referrible to ammonia or its salts, says that these are always contained in distilled water. He alleges, in support of this opinion, that such water always becomes turbid on the addition of acetate of lead, from the carbonate of ammonia therein contained, whilst this reaction does not take place if a mineral acid is added to the water previous to distillation\*. These observations, however, are not exact; for such precipitate is not carbonate of lead, since it is also formed in water to which sulphuric acid has been added previous to distillation†. We do not deny, in other respects, the beneficial influence of ammonia as a component part of dung, marl, burnt clay, and other substances which forward the nutrition of plants: we have only to observe that its chief use is, not, to be separately absorbed, but as a means of dissolving humus and those insoluble organic matters which are contained in soil and in the atmosphere.

I mention the atmosphere, because bodies floating in it perform a part in the vegetable kingdom. To these corpuscles must be attributed that excess of earthy and saline matter which is obtained from plants nourished with distilled water, as compared with the similarly constituted matter which is contained in seeds—an observation to which I referred in the case of bean-plants.

If these partly organic corpuscles of plants furnish earths and salts, they must also introduce into them carbon, oxygen, hydrogen, and azote. The water by which atmospheric air may be conveyed to plants retains it only partially, and, indeed, it opposes an obstacle to the gaseous vapours, which, during several distillations, accompany gases passed through water.

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\* After having pointed out that the presence of ammonia in rain and distilled water, when retained by addition of an acid, can be detected in the plainest manner on examination of the residue left behind after evaporation—after having proved the presence of ammonia—I observed that such water is made turbid by acetate of lead in consequence of the ammonia therein contained. The latter is a consequence; not a proof.—*J. Liebig.*

† By Dr. J. Liebig.



It appears from the preceding observations—

1. That fertile soil contains a mixture of soluble and insoluble organic matter; and that the introduction of the former by the roots into a plant is a powerful aid to that nutrition which is afforded by the atmosphere and water.

2. That the insoluble organic matter which is contained in a soil in much greater quantity than that which is soluble, undergoes, by the assistance of water, slow fermentation, which produces therefrom nourishing soluble matter which is capable of partially and gradually replacing the former.

3. That plants receive their azote almost entirely by absorption of soluble organic matter, direct experiments proving that they do not assimilate it in the form of gas in any considerable quantity, and that it is not contained as ammonia in the distilled water which they are allowed to absorb.

4. That there is a difference between those coloured substances serviceable for the nutrition of plants, and those not possessing this property; that the former change their colour during absorption, and mix with the plant, whilst the latter enter into the plant, but do not undergo decomposition therein.

As it has been proved that those coloured extractive matters which are serviceable for the nutrition of plants are absorbed by plants; and that neither in that which remains after absorption, nor in the transpiration from the plant, nor in the surrounding air, nor in the plant itself, are they found in their previous unchanged state; so we must presume that they have disappeared in consequence of the plant assimilating part of their elements.

*Appendix.*—The azote of extractive matter so necessary for the nutrition of plants escapes sometimes during their growth in the form of gas, or by the rapid fermentation induced by porous bodies in an atmosphere of carbonic acid and azote\*.

By inquiring in what manner this loss is replaced during the vegetation which succeeds, it must be presumed that atmospheric azote is condensed.† This takes place, 1stly, if the porous organic substance, under circumstances favourable to the production of hydrogen gas, is disposed to undergo slow fermentation; 2dly, by the protoxides of iron and of manganese contained in vegetable earths‡; 3dly, by the electricity existing during rain in a thunder-storm§. Ammonia and sulphuric

\* Altération de l'air par la germination et la fermentation.—*Mém. de la Société de Phys. et d'Hist. Nat. de Genève*, t. vi. p. 571.

† *Ibid.* p. 562, 567.

‡ According to Sprengel.—*Journal für Practische Chemie*, vol. i., p. 161.

§ Mr. Lampadius (*Journal für Practische Chemie*, vol. xiv., p. 161) has confirmed the presence of sulphuric acid in rain during thunder-storms only. I found ammonia only in the latter, which Dr. Liebig has found in rain usually.—(*Chim. Org.*

acid are the only products of such condensations that we are cognizant of. By supposing, however, that these different sources of azote co-operate in vegetation, we are obliged to dispense with experiment, since no observation has yet proved that plants directly assimilate, ammonia or sulphuric acid\*. We must infer that they appropriate to themselves the dead matter of plants in order to produce combinations, which are very similar to those which they receive for their nutrition from mould. —*Bibl. Univers.* vol. xxxv. p. 330, in *Liebig's Annalen*.

## PRACTICAL PHARMACY.

### ART. VIII.—*Liquor Taraxaci*.

A VERY elegant preparation has been introduced under the above title, and which, from the strong taste it possesses of the recent root, has been much used by medical men who have confidence in the remedial powers of Dandelion. The following formula has been communicated to us :—

Dandelion roots, perfectly clean, *dried*, and sliced, 18 ounces.

Infuse for 24 hours in a sufficient quantity of cold distilled water to cover them.

Press and set aside, that the feculæ may subside; decant and heat the clear liquor to 180° F., so as to coagulate the albumen; filter the liquid whilst hot, and evaporate in a drying room, or by means of a current of warm air (a water or steam bath will not succeed so well), until the product shall weigh 14 ounces. To this must be added 4 ounces of rectified spirit. Should the roots not have been perfectly cleansed, the product must be digested with pure animal charcoal. If properly prepared, *Liq. Taraxaci* resembles in colour pale Sherry, and possesses the acrid taste of the fresh root in an eminent degree. The dose is from one to three fluid drachms.

### ART. IX.—*New Chymical Analysis of Angelica Root, with an account of its Preparations.* By L. A. BUCHNER, JUN.

THE author would not have undertaken a new analysis of this root, had it not been that while preparing a spirituous extract of it, he lighted on some phenomena which appeared both new

*appliquée*, p. 78.) The Editor of the *Annalen der Ch. u. Pharm.* remarks—"What has the thunder-storm (the electrical phenomenon) to do with ammonia?"

\* I have grown beans in the open air in sand, with water containing  $\frac{1}{1000}$  of sulphate of ammonia; they did not thrive so well as in sand which was only irrigated with pure water.

and interesting. He has found a large quantity of crystallizable sugar in angelica root, and has been so fortunate as to resolve the *angelica balsam* of Messrs. Bucholz and Brandes into several ingredients and products.

He has found the following substances:—Essential oil; a peculiar volatile acid (angelicic acid) of a pungent, sour smell, and biting acid taste, sometimes fluid and oleaginous, sometimes crystallized in striated prisms; a wax-like substance (angelica wax); a crystallizable sub-resin (angelicine) of a durable, burning, spicy taste; an amorphous brittle resin of a brown colour; picrine; tannin, forming a green precipitate in solutions of iron, partly unaltered, but partly modified and converted into what is called oxidized extractive matter; malic acid, partly free, and partly combined; sugar, both crystallizable and amorphous; gummy extractive matter; starch flour; albumen; vegetable jelly (pectic acid, as it seemed), combined with lime; fibrine; several salts, particularly phosphate of magnesia, with a little phosphate of lime; lastly, silicic acid and oxide of iron.

#### ON THE PREPARATIONS OF ANGELICA.

The best preparations are those in which either the tonic or the stimulant qualities of the root predominate, or both are combined, according to the effect which it is wished to produce. The essential oil, a distilled water, an extract prepared with ether, pure angelicine, and angelicic acid, chiefly stimulating. The *essential oil* is not easy to exhibit separately, as it readily becomes resinous, and under the oxidizing influence of the atmosphere seems to be gradually changed into other substances, which combine to form angelica balsam. Its effect, moreover, is the same as that of many other ethereal oils, which are easier to procure and to preserve.

*Distilled angelica water* is to be considered as an aqueous solution of the ethereal oil. It has a strong odour of angelica, and a biting aromatic taste; but the minute state of division in which the essential oil exists in it, turns it into resin still more rapidly. A spirit drawn over from the root has but slight traces of the oil, owing to its great volatility; hence it has but a faint odour and taste of angelica. The *ethereal extract* consists almost entirely of balsam of angelica, and, as its odour and taste indicate, it is a powerful and permanent stimulus. It would be most conveniently administered in the form of pills. The *ethereal tincture* is to be considered merely as a solution of this extract. The process for making *pure angelicine* is troublesome, and the quantity obtained small. As a remedy it may be well spared, the substitutes being either the balsam or the ethereal extract; nevertheless, it might be well to study its pharmacodynamic

powers. This last observation applies also to *angelicic acid*, whose burning and stimulating effect upon the tongue, which vanishes again so quickly, distinguishes it from the other constituents of angelica, and indicates a similar effect upon the mucous membrane of the stomach and bowels. Hence it richly deserves the attention of practitioners. In fact, when this acid, or its solution, is swallowed, it produces a glow in the throat and stomach, which, however, soon ceases, and leaves behind merely an increased appetite. The tonic effect alone of angelica root will not be required in practice, as it is to be had from other medicines in a better and simpler form. But the combination of a tonic and a stimulus, which is to be found in several preparations of angelica, sometimes one and sometimes the other predominating, deserves especial attention.

Among the best of the preparations of angelica, all of which contain picrine and taunin, which yields a green precipitate with iron, together with a moderate quantity of the balsam, is the *infusion*. This is prepared hot, either with water or wine. Water, indeed, dissolves little or none of the angelica balsam; but, through the action of the hot water on the root, the balsam melts in the vessels: a part is drawn out by the dissolving sugar mixed with it, and when the infusion has grown cold, by means of the gummy extractive matter and dissolved starch, the balsam remains minutely divided in the fluid, which is somewhat cloudy. This infusion, therefore, is not to be filtered, as the suspended balsam will remain behind, and the infusion will lose in power. The same holds good of a vinous infusion.

*An extract of angelica*, prepared with the purest rectified spirit, on evaporation to the consistence of syrup, divides into two dissimilar portions. If the consistence is thicker, the contained sugar crystallizes, and the crystallized particles accumulate in masses, so that the extract becomes heterogeneous, the balsam not being equably divided. For this reason the majority of Pharmacopœias have ordered the spirituous extract to be prepared with a diluted spirit. The Prussian Pharmacopœia makes an extract first with rectified spirit, and then with water. After an aqueous extract has been concentrated by evaporation, it directs spirit to be added, in order that the gum may be precipitated; the combined and filtered spirituous fluids are then to be added, and the mixture is to be evaporated to the thickness of syrup. It is clear that this mode of proceeding is not judicious; as something is extracted by water, which must afterwards be precipitated by spirit. The Bavarian Pharmacopœia has given a better and simpler formula. The extract is to be made with a mixture of eight parts of rectified spirit; the spirit then distilled off; and, lastly, the extract evaporated.

Dr. Mohr's formula (*Pharmacopœia Universalis*, auct. Geiger et Mohr, ii. 385) is better still, and prevents too small a quantity

of the balsam, or too large a one of the inactive, gummy extractive matter from being dissolved. He proposes, first, to make an extract of the root with rectified spirit; then with a mixture of equal parts of rectified spirit and water; next, when the fluids have been pressed out and filtered, to distil off the spirit, and evaporate the remainder in a water-bath to a proper consistence. An extract is thus procured of a strong balsamic odour, and a sharp, balsamic, yet cooling, taste, which, when mixed with water, affords a turbid solution. The object of the employment of spirit mixed with water for the second extraction, is to dissolve some of the gummy particles, and obtain them in the extract. When the extract is dissolved in water, the oily and resinous balsam is not indeed dissolved by means of these gummy particles, but it is proportionately suspended, so as to form a cloudy, milky mixture—a kind of emulsion.

*Tincture of Angelica.*—For the preparation of tincture of angelica, the strongest rectified spirit may be employed, so as to dissolve all the balsam out of the root. It also contains, as appears from the analysis, picrine, iron-green tannin, free malic acid, and a considerable quantity of sugar. In order that the sugar may not crystallize, the tincture should not be too concentrated.—*Schmidt's Jahrbücher*, August 1842, from *Buchner's Repertorium*.

Although angelica root is not much in vogue in England, the preceding article is valuable as an example of that species of investigation for which continental pharmaciens are so eminent.

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ART. X.—*On certain Articles in the Russian Trade.* By  
DR. F. GOEBEL.

[Continued from page 85.]

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7. RHUBARB ROOT.

THAT rhubarb which is usually obtained in the druggists' and apothecaries' shops comes from China, and two species of Chinese rhubarb are known in trade. The one is termed Russian, Moskovian, or Siberian rhubarb; the other, East Indian, Chinese, Danish, Dutch, &c. rhubarb. The latter is brought to Europe from Canton, by sea, in vessels of different nations, especially English; and this is the cause of the different appellations by which it is known. That such is the case is as well known as that the Siberian or Russian rhubarb is transported to Russia via Kjachta, and sent from Moscow and St. Petersburg to other countries. In the following article we shall call that rhubarb which is brought from China into Russia via Kjackta, Russian rhubarb; and that which is brought to Europe by East Indiamen via Canton, East Indian rhubarb, in order to

avoid diversity of names, and, consequently, unnecessary explanations.

There exists between Russia and China a commercial treaty, according to which the Chinese government is bound to send a certain quantity of rhubarb, of a particular description, to Kjachta, where it is received by officers of the Russian government; in exchange for which, on the part of Russia, a certain quantity of furs, of a peculiar quality, are transmitted to the officers of the Chinese government. China furnished formerly 1000 puds = 40 pounds each, or 40,000 pounds annually. At the present time, however, the Chinese are not able to furnish more than 500 puds = 20,000 pounds of rhubarb of the particular quality which Russia demands and receives.

For the purpose of furnishing Kjachta with this rhubarb, the governors of the provinces where the rhubarb grows, publish, according to orders officially received from Pekin, a proclamation for collecting rhubarb, and contract with each of the collectors, or their factors, as to price. These factors or dealers bring the rhubarb to Kjachta, where, and after the delivery has been effected, they receive an acknowledgment of the quantity. This they hand over to their governor, and receive payment as fixed by the previous contract with him.

The imported rhubarb is then carefully examined at Kjachta by Russian government officers. Some of the roots, suspected not to be of the sort required, are tried with a borer, in order to ascertain their quality. The rhubarb is then freed from all foreign matter; again pared and rasped: that which has been rejected, as well as the rind and the rubbish, belongs to the Chinese, who take back the rejected pieces again to China, whilst the rind and small fragments are burnt. Thus it happens that from a given quantity of the rhubarb imported, taking, for instance, 1000 pounds, it often happens that from 2 to 300 pounds are rejected, according to the degree of care with which the same may have been previously prepared and selected.

At Kjachta the rhubarb is again packed, forwarded to Moscow and St. Petersburg, and there kept till sold in the warehouses of the government druggists\*. At Kjachta the rhubarb is packed up in deal chests, which are dove-tailed, glued, and planed inside, taking care to put the larger pieces of rhubarb on the outside, and to fill up the intervals with the smaller ones so closely, that it is impossible to return into the same chest, after having taken it out, that quantity of rhubarb which may have been previously packed therein. These chests are then overcast with melted pitch, and afterwards covered with raw hides turned inside out, the hairy side lying on and adhering to the pitch, so that it may

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\* In Russia every druggist practises his trade under a license from government.

be said, by this manner of packing, the drug is hermetically inclosed. Such a chest contains about 5 puds (1 pud = 40 pounds). Mr. Dyrssen bought, it may be mentioned by the way, in the year 1830, about 800 of those rhubarb-chests, whose contents he forwarded to different countries.

Russian rhubarb is decidedly superior to East Indian. It is sound throughout; but it is mere fiction to assert that it may be distinguished by the peculiar form of the pieces, and that each single piece is pierced with holes, as is now and then pretended. In the chests, pieces large and small, flat and round, angular, pierced, some bearing the marks of the borer, and also some perfectly free from such marks, are mixed together. They are of a yellowish-red colour, and, when broken, present the well-known beautiful red-and-white marbled appearance.

The statement of some writers that for the imperial court of Russia only a white species of rhubarb is used—and this, it is said, taken from *Rheum leucorrhizum*, (Pallas)—is equally unfounded. The same rhubarb as that we have just described is also used for the Imperial Court, excepting that only sound and fine roots are selected as a matter of course. The *Rheum leucorrhizum* (Pallas), which John V. Sievers discovered in the Sangorian steppes, and which he called *Rheum narum*, have also been since found there by Dr. Meyer. The root of this plant is spreading, white, and possesses an insipid slimy taste, not at all like that of rhubarb. The real rhubarb is likely to be the *Rheum australe* (Don), or *Rheum emodi* (Wallich), which grows on the Himalayan mountains.

East Indian rhubarb is collected in the same provinces where the Russian is obtained. The collection of rhubarb is under no restriction of the Chinese government; nor do they take any care of the rhubarb trade, which is carried on by private individuals at Canton. The proprietors of quantities of rhubarb sell them at an arbitrary price to East Indians, Americans, Dutchmen, Danes, &c. Of these, however, the English buy the most.

This East Indian rhubarb is considerably inferior in quality to the Russian; it is an assemblage of good and bad species, which, even if they be sound and well preserved, essentially differ from the Russian from the circumstance that they are not severally selected, and pared again, as are the Russian, and by which process all foreign matter is separated from the latter, together with the last remains of the cuticular substance. East Indian rhubarb is not allowed to be imported into Russia.

From Russia the carefully pared and particularly selected rhubarb alone is exported; whilst the rhubarb exported from Canton is in the same state as when brought there by the Chinese, be it of good or bad quality: and this has given rise in Germany to the commercial terms "half" and "wholly purified

rhubarb." It is not necessary to mention that the transit by sea often materially affects its quality.

This explanation also shows why the Russian rhubarb is better, and at the same time dearer, than the East Indian, and why it is generally preferred. Sometimes the Bucharians import rhubarb by Troitzq to Russia. It is, however, of an inferior description, carelessly pared, pierced with large holes, and very light; hence the name of Bucharian rhubarb.

In the Kirgisian steppes I found *Rheum caspium Pallasii* in immense quantities. The steppes on the northern shore of the Caspian sea, especially those in the neighbourhood of Arsargar and Tschaptschatkai, abounded in them. As early as the middle of June in the summer of 1834, when I was in these countries, the seeds were ripe; the high rhubarb shrubs were withered, and, being occasionally seized by the whirlwind, were formed into high whirling columns, moving majestically through the steppes, forming for a moment a magnificent *coup d'œil*, then disappearing from the sight, and falling, it might be, on other places, where the sport would be again renewed. The fresh roots of these rhubarb plants are as thick round as a man's arm, of a fleshy texture, and when dried resemble what is called French rhubarb. The pieces are of a yellowish red, and on their broken surface may be distinguished a quantity of closely drawn white and red stripes. Their taste is very astringent, and they are in general essentially different from the Chinese rhubarb.—*Liebig's Annalen*.

At a public sale, (October 6, 1842,) some very fine Russian rhubarb was offered, and brought full quotations. The chests were made of stout deal, enveloped in tarpaulin, saturated with pitch, and then covered round with stout buffalo hide, the hairy surface inward, matting with the pitchy mass,—thus rendering the contents perfectly removed from atmospheric influence. We could not help remarking the difference between these massive well-packed chests, as compared with some, containing the East Indian variety, on the same floor; these latter being usually shipped direct from China, or the East Indian Presidencies. These latter were the flimsy chests in which tea is brought over, without the tin-foil with which they are usually lined when used for tea; consequently, perfectly unprotected from all the injuries of the sea voyage to which they are exposed.

The contrast between the quantities stated in the following table,—in which is shewn the amount of duty paid at relative periods in the years 1841 and 1842,—will afford some insight into the causes of the extremely high price this drug has reached of late; since, in the case of rhubarb, it may be justly inferred, that duty is only paid when actual consumption is contemplated.



By Foreign is meant Dutch trimmed and Russian ; and by East Indian, that which is brought by East India ships.

| East Indian. |        |       | Foreign. |       | Total. |        |
|--------------|--------|-------|----------|-------|--------|--------|
| Date.        | 1841.  | 1842. | 1841.    | 1842. | 1841.  | 1842.  |
|              | lbs.   | lbs.  | lbs.     | lbs.  | lbs.   | lbs.   |
| January 18   | 1,330  | 1,403 | 3,798    | 845   | 5,128  | 2,248  |
| 25           | 1,726  | 1,403 | 4,166    | 1,781 | 5,892  | 3,184  |
| February 1   | 3,069  | 1,534 | 4,327    | 2,174 | 7,396  | 3,708  |
| 8            | 3,896  | 1,534 | 4,930    | 2,347 | 8,826  | 3,881  |
| 15           | 4,684  | 1,953 | 5,389    | 2,609 | 10,073 | 4,562  |
| 22           | 4,066  | 2,472 | 5,761    | 3,407 | 10,827 | 5,879  |
| March 1      | 5,327  | 2,611 | 5,761    | 3,407 | 11,088 | 6,018  |
| 8            | 5,459  | 3,121 | 5,761    | 3,662 | 11,220 | 6,783  |
| 15           | 5,588  | 3,502 | 5,893    | 4,784 | 11,481 | 8,286  |
| 22           | 5,588  | 3,702 | 6,069    | 4,784 | 11,657 | 8,486  |
| 29           | 6,790  | 3,702 | 6,069    | 4,784 | 12,859 | 8,486  |
| April 5      | 7,688  | 3,702 | 6,364    | 4,784 | 14,052 | 8,486  |
| 12           | 8,629  | 3,702 | 6,364    | 4,784 | 14,993 | 8,486  |
| 19           | 9,495  | 3,702 | 6,537    | 4,784 | 16,032 | 8,486  |
| 26           | 10,058 | 3,702 | 6,849    | 4,920 | 16,907 | 8,622  |
| May 3        | 10,335 | 3,828 | 7,002    | 4,945 | 17,537 | 8,773  |
| 10           | 11,420 | 4,140 | 7,348    | 4,945 | 18,768 | 9,085  |
| 17           | 12,066 | 4,274 | 7,483    | 4,945 | 19,549 | 9,219  |
| 24           | 12,066 | 4,274 | 7,483    | 5,223 | 19,549 | 9,497  |
| 31           | 12,066 | 4,402 | 8,249    | 5,223 | 20,315 | 9,625  |
| June 7       | 12,195 | 4,402 | 8,426    | 5,223 | 20,621 | 9,625  |
| 14           | 12,574 | 4,402 | 8,426    | 5,248 | 21,000 | 9,650  |
| 21           | 13,106 | 4,402 | 8,426    | 5,348 | 21,532 | 9,750  |
| 28           | 13,106 | 4,545 | 8,763    | 5,348 | 21,869 | 9,893  |
| July 5       | 13,473 | 4,707 | 8,895    | 5,348 | 22,368 | 10,055 |
| 12           | 14,090 | 4,707 | 9,936    | 5,398 | 24,026 | 10,105 |

The total quantity on which the duty of one shilling per pound was paid in the years

|                      |                  |        |
|----------------------|------------------|--------|
|                      | 1840,            | 1841.  |
| East Indian, . . . . | 16,745 . . . . . | 22,481 |
| Foreign, . . . . .   | 22,203 . . . . . | 21,702 |

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|             |             |
|-------------|-------------|
| 38,948 lbs. | 44,183 lbs. |
|-------------|-------------|

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while, for the six months of

|                        |       |
|------------------------|-------|
|                        | 1842, |
| East Indian, . . . . . | 4,707 |
| Foreign, . . . . .     | 5,398 |

---

10,105 lbs.

or about one-half the quantity of previous half years.

[At the port of London alone, from June 1841 until July 5, 1842, duty was paid on 43,100 pounds of rhubarb ; whence it would appear that this drug is chiefly imported through the above channel.—ED.]

## FOREIGN CORRESPONDENCE.

ART. XI.—*Steam-baked Bread, à la Vienna.*

It has been known for some time at Vienna, that if the hearth of an oven be cleaned with a moistened wisp of straw, bread baked therein immediately afterwards presents a much better appearance, the crust having a beautiful yellow tint. It was thence inferred that this peculiarity must be attributed to the vapour, which being condensed on the roof of the oven, fell back on the bread. At Paris, in order to secure with certainty so desirable an appearance, the following arrangement is practised:—The hearth of the oven is laid so as to form an inclined plane, with a rise of about 11 inches in three feet, and the arched roof is built lower at the end nearest the door, as compared with the furthest extremity. When the oven is charged, the entrance is closed with a wet bundle of straw. By this arrangement the steam is driven down on the bread, and a golden-yellow crust is given to the bread, as if it had been previously covered with the yolk of an egg.—*Hbgen Correspondent*, Sept. 27.

M. Kaemptz, professor of natural philosophy at Halle, and M. Abick, professor of mineralogy of the same place, have received appointments in the University of Dorpat, where they have already commenced their lectures.—*Ibid.*

ART. XII.—*Scientific Meeting at Mayence.*

THE second general meeting of the Association of Philosophers and Men of Science took place on the 22d of September, and was more fully attended than the opening of the 19th. For the session 1843 the town of Graetz, in Austria, has been chosen as the point of re-union. Professors Langer and Schroeder, of that town, and who were then present, were elected as directors of the intended meeting. Bremen was named, and seconded by many voices, as a town which, having done much in modern times for the advancement of science, should be visited: Graetz, however, carried the day. The recent speech of the Archduke of Austria, which was brought to the recollection of those present, contributed to the preference manifested for Graetz.

The report of the committee was brought up, recommending the non-acquiescence in the proposed alteration of the statutes, and was carried unanimously.

The proposition of pre-stating the themes and subjects for the ensuing year was also negatived, it being urged that such an

arrangement would limit the freedom of scientific discussion. An invitation from the Congrès Scientifique, now assembling at Strasburg, inviting the Association to meet them (le Congrès) at Strasburg, was received with much applause.

The President recommended the members present to comply with this friendly invitation. It is expected, therefore, that many will leave for Strasburg at the termination of this session. On the 26th of September the third and last general meeting will be held.

[We intend to extract from the report, when printed, whatever is interesting to the scientific chymist and pharmacologist.—ED.]

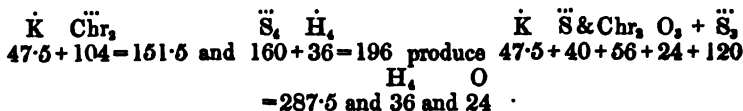
THE third and last meeting was commenced by a speech from Mr. Mayer, of Leghorn, President of the *Accademia Labronica*, who addressed the assembly in the German language, exhibiting the very close union of mind between Italy and Germany in reference to their poets, savants, and artistes, in such eloquent terms as elicited the most lively applause. He was succeeded by Dr. Creve, from Frankfort, on the power of imagination; after which by Dr. Kirnberger, jun., on the nature and molecular relations of the imponderables. Dr. Vogt, of Neuchâtel, a co-labourer of the renowned Professor Agassiz, then addressed the meeting on the subject of Glaciers, drawing a graphic picture of the life led for two months, during the present year, by a society which had for its object the exploration of the nature of Glaciers.

The meeting concluded with the usual formalities.—*Ibid.*

### ART. XIII.—*On the Preparation of Oxygen Gas.*

*To the Editors of the Annals of Chymistry and Pharmacy.*

GENTLEMEN,—Observing in the last number of the ANNALS OF CHYMISTRY a paper by Mr. Marsh, on the Preparation of Oxygen, I have taken the liberty of forwarding to you another process proposed by Mr. Balmain, of Liverpool, in a letter to the Editors of the London and Edinburgh Phil. Magazine for July last, which is as follows:—"A mixture of three parts of bichromate of potash and four parts of common sulphuric acid contained in a capacious retort, will, on the application of a moderate heat (a common spirit lamp), yield pure oxygen with a rapidity entirely at the command of the operator.



I have several times tried this process, and, from my own experience, believe that it will be found to be cheaper, and I think quite as simple, expeditious, and controllable, as that recommended by Mr. Marsh.

I am, Gentlemen,

Your obedient servant,

THOMAS DELL.

Aylesbury, October 16, 1842.

ART. XIV.—*On the same.*

*To the Editors of the Annals of Chymistry and Pharmacy.*

GENTLEMEN,—I take leave to add my testimony to the value of the process for obtaining oxygen gas described in your last number by your able correspondent Mr. Marsh. The advantages obtained from it are manifold. 1st, The celerity with which it can be obtained. I have been accustomed to have the mixture ready in a retort, so that it is but necessary to fix it and apply heat. When I have obtained the quantity of gas required, I still allow the mixture to remain in the retort; being led to believe that it reabsorbs oxygen from the air, and so may again come into use. 2dly, The quantity of gas obtained: 100 grains of the mixture will give off 110 cubic inches of gas. 3dly, The little fuel required, and the little loss of retorts.

I have known and used this process for a very considerable length of time, and have shewn it to many scientific gentlemen in the laboratory in which I am employed. I first learnt it from Mr. Anderson, the assistant to Dr. Faraday, and was at the time informed that it was the discovery of that philosopher, and had been communicated to the world. Indeed, from this circumstance I was led to believe that perhaps the knowledge of the rapid manner in which oxygen could be thus obtained, and its supply so well regulated, constituted part of the secret of Dr. Payerne.—I am, gentlemen, your obedient servant,

Tottenham Court Road, October 17, 1842.      GEORGE THOMAS FISHER.

ART. XV.—*Preservation of Leeches.*

*To the Editors of the Annals of Chymistry and Pharmacy.*

GENTLEMEN,—On reading Dr. Wagner's article on leeches, it occurred to me that to suggest a mode of keeping them would not be unacceptable to many of your readers, especially to druggists and dealers in leeches; it is very simple, and of all others the most successful, being as follows:—

A quantity of pure clay is procured, to which must be added as much pure water as will make it so plastic as to be easily formed into *irregular shaped balls*, say two inches and a half in diameter. These are placed into a square deep wooden box, or, what will answer equally well, a five-gallon keg; *a cover is quite unnecessary*. The leeches are then put in, immediately on which they creep down the sides of the balls of clay, and there remain. When required for use, the balls are carefully removed, and the leeches are taken out. It will invariably be found, that leeches kept in this way will, without hesitation and at once, lay hold of any part to which they may be applied. It will be borne in mind that the balls must be renewed weekly. It is unnecessary to expatiate on the advantages of this mode of preserving leeches over others, since a single trial will be found as satisfactory as it is here represented.

In your formula for *Eau de Cologne*, would you oblige me by stating\*, whether the six *fluid drachms* of spirit of wine should not be *ounces*, since the prescribed essences and oils seem to me to be unusually great for so small a quantity of the mixture.—Apologizing for the trouble, believe me, gentlemen, your most obedient servant,

Liverpool, 17, Percy Street, October 18, 1842.      J. R. KENWORTHY.

\* We beg to refer our correspondent to the last page of the present number.—Ed.

| NOMINA.                          | FORMULÆ.                                                                                                                                       |
|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>Acidum</i> Hypo Phosphorosum. | $\dot{\text{P}}_2 \dots \dots \dots$<br>$\dot{\text{P}}_2^3 \dots \dots \dots$<br>$\dot{\text{P}}_2^3 \dots \dots \dots$                       |
| — Hypo Sulphuricum. . .          | $\ddot{\text{S}}_2 \dots \dots \dots$<br>$\ddot{\text{S}}_2^4 \dots \dots \dots$<br>$\ddot{\text{S}}_2^3 \dots \dots \dots$                    |
| — Hypo Sulphurosum. . .          | $\ddot{\text{S}}_2 \dots \dots \dots$<br>$\ddot{\text{S}}_2^4 \dots \dots \dots$<br>$\ddot{\text{S}}_2^3 \dots \dots \dots$                    |
| — Jodicum. . . . .               | $\ddot{\text{J}}_2 \dots \dots \dots$<br>$\ddot{\text{J}}_2^4 \dots \dots \dots$<br>$\ddot{\text{J}}_2^3 \dots \dots \dots$                    |
| — Malicum. . . . .               | $\bar{\text{Ml}}=\text{H}^4\text{C}^4\text{O}^4 \dots$<br>$\bar{\text{Ml}}^4 \dots \dots \dots$<br>$\bar{\text{Ml}}^3 \dots \dots \dots$       |
| — Manganicum. . . . .            | $\bar{\text{Mn}} \dots \dots \dots$<br>$\bar{\text{Mn}}^4 \dots \dots \dots$<br>$\bar{\text{Mn}}^3 \dots \dots \dots$                          |
| — Margaricum. . . . .            | $\bar{\text{Mr}}=\text{H}^{67}\text{C}^{55}\text{O}^3 \dots$<br>$\bar{\text{Mr}}^4 \dots \dots \dots$<br>$\bar{\text{Mr}}^3 \dots \dots \dots$ |
| — Molybdicum. . . . .            | $\bar{\text{Mo}} \dots \dots \dots$<br>$\bar{\text{Mo}}^4 \dots \dots \dots$<br>$\bar{\text{Mo}}^3 \dots \dots \dots$                          |
| — Mucicum. . . . .               | $\bar{\text{M}}=\text{H}^{10}\text{C}^6\text{O}^8 \dots$<br>$\bar{\text{M}}^4 \dots \dots \dots$                                               |

| PONDERA ATOMORUM. |                     | PARTES CENTESIMALES. |           |                       |
|-------------------|---------------------|----------------------|-----------|-----------------------|
| O = 100.          | H <sub>2</sub> = 1. | + E.                 | — E.      | H vel H <sub>2</sub>  |
|                   |                     | C = 15,95            | S = 62,97 | H <sub>2</sub> = 2,60 |
| 492,28            | 39,45               | 79,69                | 20,31     |                       |
| 984,57            | 78,89               |                      |           |                       |
| 1476,85           | 118,34              |                      |           |                       |
| 902,33            | 72,30               | 44,59                | 55,41     |                       |
| 1804,66           | 144,61              |                      |           |                       |
| 2706,99           | 216,91              |                      |           |                       |
| 602,33            | 48,26               | 66,80                | 33,20     |                       |
| 1204,66           | 96,53               |                      |           |                       |
| 1806,99           | 144,79              |                      |           |                       |
| 2079,50           | 166,63              | 75,96                | 24,04     |                       |
| 4159,00           | 333,26              |                      |           |                       |
| 6238,50           | 499,90              |                      |           |                       |
| 730,71            | 58,55               | C = 41,84            | O = 54,74 | H = 3,42              |
| 1461,42           | 117,10              |                      |           |                       |
| 2192,13           | 175,66              |                      |           |                       |
| 645,89            | 51,75               | 53,55                | 46,45     |                       |
| 1291,77           | 103,51              |                      |           |                       |
| 1937,66           | 155,27              |                      |           |                       |
| 3393,88           | 271,91              | C = 78,84            | O = 8,84  | H = 12,32             |
| 6786,76           | 543,83              |                      |           |                       |
| 10180,14          | 815,74              |                      |           |                       |
| 898,52            | 72,00               | 66,61                | 33,39     |                       |
| 1797,04           | 144,00              |                      |           |                       |
| 2695,56           | 216,00              |                      |           |                       |
| 1821,02           | 105,85              | C = 34,72            | O = 60,56 | H = 4,72              |
| 2642,05           | 211,71              |                      |           |                       |

| NOMINA.                         | FORMULÆ.                        |
|---------------------------------|---------------------------------|
| <i>Acidum Mucicum</i> . . . . . | $\bar{M}^s$ . . . . .           |
| — Nitricum. . . . .             | $\ddot{N}$ . . . . .            |
|                                 | $\ddot{N}_2$ . . . . .          |
|                                 | $\ddot{N}_2^s$ . . . . .        |
| — Nitrosum. . . . .             | $\ddot{N}_2^s$ . . . . .        |
|                                 | $\ddot{N}_2$ . . . . .          |
|                                 | $\ddot{N}_2^s$ . . . . .        |
| — Oleicum. . . . .              | $\bar{O}l = H^{120} C^{70} O^s$ |
|                                 | $\bar{O}l^s$ . . . . .          |
|                                 | $\bar{O}l^s$ . . . . .          |
| — Osmicum. . . . .              | $\ddot{O}s$ . . . . .           |
|                                 | $\ddot{O}s^s$ . . . . .         |
|                                 | $\ddot{O}s^s$ . . . . .         |
| — Oxalicum. . . . .             | $\ddot{C}_2$ . . . . .          |
|                                 | $\ddot{C}_2^s$ . . . . .        |
|                                 | $\ddot{C}_2^s$ . . . . .        |
| — Oxychloricum. . . . .         | $\ddot{Cl}_2$ . . . . .         |
|                                 | $\ddot{Cl}_2^s$ . . . . .       |
|                                 | $\ddot{Cl}_2^s$ . . . . .       |
| — Oxymanganicum. . . . .        | $\ddot{Mn}_2$ . . . . .         |
|                                 | $\ddot{Mn}_2^s$ . . . . .       |
|                                 | $\ddot{Mn}_2^s$ . . . . .       |
| — Phosphoricum. . . . .         | $\ddot{P}_4$ . . . . .          |
|                                 | $\ddot{P}_4^s$ . . . . .        |
|                                 | $\ddot{P}_4^s$ . . . . .        |
| — Phosphorosum. . . . .         | $\ddot{P}_4$ . . . . .          |
|                                 | $\ddot{P}_4^s$ . . . . .        |

| PONDERA ATOMORUM. |                    | PARTES CENTESIMALES. |        |                      |
|-------------------|--------------------|----------------------|--------|----------------------|
| O = 100           | H <sub>1</sub> = 1 | + E                  | — E    | H vel H <sub>1</sub> |
| 3963,07           | 317,56             |                      |        |                      |
| 677,04            | 54,25              | 26,15                | 73,85  |                      |
| 1354,07           | 108,50             |                      |        |                      |
| 2031,11           | 162,75             |                      |        |                      |
| 477,04            | 38,22              | 37,11                | 62,89  |                      |
| 954,07            | 76,45              |                      |        |                      |
| 1431,11           | 114,68             |                      |        |                      |
| 6599,40           | 528,81             | C=81,08              | O=7,58 | H=11,34              |
| 13198,80          | 1057,63            |                      |        |                      |
| 19798,20          | 1586,45            |                      |        |                      |
| 1644,49           | 131,77             | 75,68                | 24,32  |                      |
| 3288,97           | 263,55             |                      |        |                      |
| 4933,46           | 395,32             |                      |        |                      |
| 452,87            | 36,29              | 33,76                | 66,24  |                      |
| 905,75            | 72,58              |                      |        |                      |
| 1358,62           | 108,87             |                      |        |                      |
| 1142,65           | 91,56              | 38,74                | 61,26  |                      |
| 2285,30           | 183,13             |                      |        |                      |
| 3427,95           | 274,68             |                      |        |                      |
| 1391,77           | 111,52             | 49,70                | 50,30  |                      |
| 2783,55           | 223,06             |                      |        |                      |
| 4175,92           | 334,57             |                      |        |                      |
| 892,28            | 71,50              | 43,96                | 56,04  |                      |
| 1784,57           | 143,00             |                      |        |                      |
| 2676,85           | 214,50             |                      |        |                      |
| 692,28            | 55,47              | 56,67                | 43,33  |                      |
| 1384,57           | 110,95             |                      |        |                      |



## NOTE FROM DR. COLLIER.

*To the Editors of the Annals of Chymistry.*

GENTLEMEN,—In your first number of the *Annals of Chymistry*, you have done me, I dare say quite unintentionally, a manifest injustice, but one calculated to do more harm to yourselves as critics than to me. At page 23, under the head “Our Pharmacopoeia,” you say, “Dr. Collier has been guilty of an oversight in his supplement, calculated indirectly to mislead the dispenser, since in his remarks on the *Liq. ammon. acetat.* dilute pyroligneous acid is mentioned, whilst the *acetum destillatum* is ordered by the College,” &c. Let your readers and mine refer to page 20 of that, to me, very expensive and unprofitable work, and you will find it thus written :—“Again, if we purchase pyroligneous acid of 3 per cent., we commit two errors at one and the same time :—First, we have comparatively an impure acid; and, secondly, from its weakness, we shall not have the due proportion of the acetate in any given quantity of the liquor.”

Yours, Gentlemen, is an infant journal, and must be hailed with liberality and forbearance; and I will leave it to you to rectify it in your own way. It is most assuredly an extraordinary misapprehension. If you think that the correction of the error is more than the infancy of your journal can afford, pray let it pass, and I will notice it in due time elsewhere.—Your obedient servant,

32, Spring Gardens, Oct. 13, 1842.

G. F. COLLIER.

[We thank Dr. Collier for his correction, and can assure him that our journal will never be too tender to do justice to any one, much less to him who has done so much for Pharmacy, in the capacities of author and teacher.—Ed.]

## VARIOUS COLOURED FIRES.

*To the Editors of the Annals of Chymistry.*

GENTLEMEN,—Perhaps one of your correspondents would favour me with the composition of the various coloured fires used at the theatres. There are four decided colours—red, green, yellow, and deep blue or purple.—Yours truly,

PHILO.

## NOTICES TO CORRESPONDENTS.

[In consequence of one of the revised proof-sheets not having reached the printer before going to press, the Formulæ for Aromatic Vinegar, Eau de Cologne, and Succus Limonum, were incorrectly given in our last. We have, therefore, re-inserted them, with the corrections.—Ed.]

AROMATIC VINEGAR.—Glacial Acetic Acid, ʒviij. : Essential Oil of Rosemary, grs. xx. ; of Bergamot, grs. xv. ; of Lavender, grs. ix. ; of Cloves, grs. xxiv. ; of Pimento, grs. xij. ; of Cinnamon, grs. xx. ; of Orange Flower (Neroli), grs. iv. : S. V. R. ʒij.

CHYMICUS, Brighton.—The formula of the British Eau de Cologne is as follows; and we have to observe, that if the Spirits of Wine be perfectly clean, and the Oil of Neroli of *first quality*, it is quite equal to any that can be imported :—

Ess. Bergamot, ℥xl. ; Ess. Limon. ℥xliv. ; Ol. Rorismar. ℥vj. ; Ol. Aurantii, ℥xxij. ; Ol. Neroli Opt. ℥xij. ; S. V. R. fʒvj.—Misce.

M. P. S., Newcastle.—Subjoined are the formulæ of Messrs. ALLEN, HANBURY, and BARRY, of Plough Court :—

SUCCUS LIMONUM.—Acid. Citric. Cryst. ʒij. gr. xxxij. ; Aq. Destill. ʒiv. ; Ol. Limonis, gtt. j. ; S. V. R. fʒij. M. fiat solutio.

SYRUPUS LIMONUM.—Succ. Limonum, Oj. ; Acid. Citric. Cryst. ʒij. ʒ. ; Aq. Destill. O2 ; Sacch. Alb. lb. 5 a. Solve a. a.

ARTICLES on Acetic Acid, Expressed Juices, Liquor Opii Sedativus, and Photography—unavoidably deferred until our next.

•• Communications, Books for Review, &c. are requested to be addressed—“To the Editors of the ANNALS OF CHYMISTRY, care of Messrs. Longman, Brown, and Co. Paternoster Row.”

WILSON AND OGILVY, 57, SKINNER STREET, SNOWHILL, LONDON.

THE  
ANNALS OF CHYMISTRY  
AND  
PRACTICAL PHARMACY.

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No. 5.]      FRIDAY, OCTOBER 28, 1842.      [Vol. I.

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SCIENTIFIC ASSOCIATIONS.

It has been justly observed by LIEBIG (in his work on Agricultural Chymistry), that one of the most striking characteristics of modern times is the assemblage of men of science for the purpose of discussing the subjects to which they have severally devoted their lives. The early societies of this kind were chiefly composed of persons residing in the same town, whose industry was occasionally quickened, and whose emulation was often fired, by the contributions of distant correspondents. Of late years, however, the facilities of locomotion have given birth to societies of a more nomadic stamp, whose place of meeting is no longer a fixed one, and whose remote correspondents are transformed into present debaters. In fact, steam, which has almost realized the wish of the lovers in NAT. LEE's tragedy—

“Ye Gods! annihilate but space and time,  
And make two lovers happy!”

steam, which is equally potent in the vast and in the little, like the trunk of an elephant, which can root up a tree, or pick up a pin, has effected this change likewise, and contributed to form the learned of Europe into one family.

The encouragement given to investigation by societies of either sort, the stationary or the ambulant, is too obvious to be dwelt upon. Those of the former class will have the advantages resulting from repose and reflection; those of the latter will be spurred on by a sharper rivalry, and may boast that the raciness of foreign views, and the collision of differently-trained intellects, give zest to their meetings.

Of course all such associations exhibit marks of human  
VOL. I. K

frailty. If influential members, instead of communicating new facts, or verifications of old ones, occupy the time of the assembly with crude hypotheses, built on uncertain premises, it must be acknowledged that they have wasted the stuff which life is made of. But this is the abuse of the thing ; not the use. If the admixture of evil were a strong argument against such unions, it would be equally valid against all scientific pursuits, or even against the practice of the arts of ordinary life. Yet we continue to eat bread, even baker's bread, though at the risk of swallowing alum as well as flour. To deny that any advantage results from such associations, is to deny the superiority of united over individual efforts.

It is obviously improbable that many new and striking facts should be brought forward at every anniversary of a scientific society ; yet it would be unjust to suppose that the meeting has, therefore, been in vain. The mere sight of friendly rivals is a stimulus to renewed exertion, and their smiles are a reward for the toil of tedious investigation. It would be unfair to deride the promoters of such meetings, because they are not followed by immediate results. Are those long discussions which commonly precede practical measures on the political arena, so totally unfitted for the Hall of Science ? It has been profoundly observed by BACON, that " reading maketh a full man ; conference a ready man ; and writing an exact man \*," and the student who desires to benefit the world, will do well to test the results of his lucubrations by conversation with his fellow-labourers.

As to those simple-minded essayists, who, like DOGBERRY, could find it in their hearts to bestow their whole tediousness on the assembly, their reign will not be unlimited ; the profound inattention, and the varied arts of interruption, practised in more popular debating societies, will be transplanted into these learned bodies, and bounds will be set to prolixity.

On the whole, such meetings must be of large advantage to the practical man, as well as the lover of abstract truth ; and it is with pleasure we see that they have gradually spread over the Continent of Europe.

The meeting held this year at Mayence, and the French

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\* Essays. Of Studies.

Scientific Congress which lately assembled at Strasburgh, closely approach, in their objects, to the British Association. Among the thirty questions proposed by the French Congress for the consideration of their third section, the following will especially interest our readers:—

“ 26. On the organization of pharmacy in France, and principally: (1) on the utility of limiting the number of shops, and on the expediency of making the possessors give security; (2) on the establishment of departmental chambers of discipline; (3) on the necessity of revising or amending the 34th article of the law of the 21st Germinal of the year XI., concerning the sale of poisons; (4) on the means of attaining the suppression of secret remedies.

27. On the employment of electro-galvanism in pharmaceutical operations.

28. On the revision of the Codex.

29. On the different methods of preparing calomel; and to determine whether the difference in the effect of the remedy is to be attributed to the process followed.

30. To give the history of the products obtained from the *Lactuca sativa*, *virosa*, *scariola*, and chiefly of *Lactucarium* and *Thridace*.”

Nor, while we applaud these great national gatherings, would we withhold our approbation from minor assemblies—from chymical, electrical, or pharmaceutical societies. On the contrary, we rejoice to see these cheerful *reunions* of men of similar pursuits, and consider them as the rivers which feed the ocean of science. In the tolerant regions of knowledge, let no man think his contribution too small to be accepted, but let him forthwith pay his mite to the treasury—

Ore trahat quodcumque potest, atque addat acervo!

## CHYMISTRY, OPERATIVE AND EXPERIMENTAL.

### ART. II.—*Chloride of Palladium as a Reagent for Iodine.*

BAUMANN has undertaken experiments on the proportionate sensibility of an acidulous solution of chloride of palladium and the ordinary solution of nitrate of silver as a reagent for iodine, and he observed, 1stly, that one drop of the former solution produces, in a solution of iodide of palladium, as copious a precipitate as several drops of the latter; and, 2dly, that

nitrate of silver, diluted to  $\frac{1}{50000}$ , causes a white turbidity, whilst chloride of palladium, after standing for some time, produced some small black flakes; when diluted, however, to  $\frac{1}{500000}$ , neither of them yielded any further reaction. M. Baumann is of opinion that the dark colour of the palladium precipitate being easier recognized, is the more eligible test.—*Archiv. d. Pharmacie.*

ART. III.—*Method of distinguishing Zinc from Manganese in Solutions containing Salts of Ammonia.* By Professor OTTO.

I SOUGHT for some method whereby I might easily distinguish zinc from manganese in solutions containing such considerable quantities of the salts of ammonia, that alkalis and their carbonates indicated no decided reaction, or perhaps none at all; and for my purpose it was of importance to distinguish, immediately and with precision, whether zinc was present in a solution, or manganese. Certain peculiarities of the precipitates produced in solutions of oxide of zinc and protoxide of manganese by prussiate of potash and bihydrosulphuret of ammonia are already well known. If the solutions of chloride of manganese and chloride of zinc are precipitated by prussiate of potash, the precipitate produced in the manganesian solution (as Wackenroder has shewn in his tables) easily redissolves on the addition of muriatic acid, whilst the precipitate occasioned in the zinc solution is almost insoluble in muriatic acid. If, however, the experiment is undertaken with solutions containing hydrochlorate of ammonia, another result is obtained: viz. that the precipitate obtained by prussiate of potash in the solution of manganese is equally insoluble in muriatic acid. And not only hydrochlorate of ammonia, but perhaps other salts, even prussiate of potash, added in excess, have the same effect. This method, therefore, proved useless. If solutions of chloride of zinc and chloride of manganese, containing also much hydrochlorate of ammonia, are rendered alkaline by liquid ammonia (a precipitation will not of course ensue under these circumstances), by adding even a very small quantity of a solution of sulphuretted hydrogen to the zinc solution, the thick hydrated precipitate of sulphuret of zinc is instantly produced, whilst in the solution of manganese no precipitate is produced, and it is only by the addition of a greater quantity that sulphuret of manganese is precipitated. If, however, concentrated acetic acid is added to the precipitate of sulphuret of manganese, it easily dissolves, whilst the precipitate of sulphuret of zinc remains undissolved. The object was hereby attained. I recommend the application of sulphuretted hydrogen water, and not bihydrosulphuret of ammonia, since the latter, which is

never free from supersulphuret, as its name indicates, is apt to mislead; because, when acetic acid is added, sulphur is necessarily separated. If, for instance, we wish to ascertain whether ferrum limatum contains brass, the mixture may be dissolved in nitromuriatic acid, the oxide of iron precipitated by an excess of ammonia: the liquid has then to be acidulated, the copper removed by sulphuretted hydrogen, and to the filtered liquid, which generally still contains a sufficient quantity of sulphuretted hydrogen, ammonia must be added. If a white precipitate, insoluble in concentrated acetic acid, is produced, I think the presence of zinc is satisfactorily proved. It was Wackenroder who recommended the solubility of sulphuret of manganese in acetic acid for the purpose of separating manganese from other metals.—*Liebig's Annalen*.

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ART. IV.—WACKENRODER *on the Reduction of the Oxisalts of Iron by Organic Acids.*

It is known that the volatile, monobasic, nonazotised organic acids neither reduce acetate of peroxide of iron into protoxide, nor the sesquichloride of iron\*, into chloride. Oxalic acid is an exception which has been known for some time. The reduction is, however, not only produced by sunlight, but also by heating, and sometimes merely by the application of slight warmth. Formic acid, however, when boiled with sesquichloride of iron, produces also a small quantity of chloride.

The nonvolatile polybasic nonazotised organic acids act, on the other hand, altogether as reductives, reducing the sesquioxide and sesquichloride of iron into protoxide and chloride; sometimes requiring the aid of heat, at others momentarily, even when cold.

1. Malic, kinic, citric, racemic, tartaric, and mucic acids, either alone, or still more readily in combination with alkalis, deoxidate the sesquioxide of iron only when they are boiled with it, or with its salts. The deoxidation, however, is not perfectly completed, that is, the sesquioxide is not reduced to a protoxide, but only to the state of magnetic oxide; whence a supposition might be formed, that unchangeable double salts, of a combination of peroxide with protoxide analogous to the ferro-sesquicyanurets, are produced.

What change takes place in organic acids, especially in racemic acid, in consequence of the apparent absorption of oxygen from the oxide of iron, must for the present remain unanswered. Dr. W. has never been able to detect an evolution of gas during the reduction of the sesquioxide of iron.

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\* The sesqui has reference to the state of oxidizement, not to the quantity of chlorine combined with the iron.

2. The similarly constituted and easily decomposed acids, such as gallic and the tannic, from oak bark, also that from catechu and ulmic acid, act, however, with great energy on the sesquioxide and sesquichloride of iron. They do not require the aid of heat for that purpose, and gallic acid is capable of completely reducing the sesquichloride of iron into chloruret or chloride of iron. The coloured combinations, which are precipitated by these acids from the salts of sesquioxide of iron, always contain magnetic oxide. The rapidity of the reduction may be shewn by the fact, that if a very small quantity only of one of the above-named acids be added to a diluted solution of chloride of sesquioxide of iron, mixed with ferrocyanide of potassium, the liquid instantly assumes a bluish-green colour, or a dark-blue precipitate is produced. This at once shows also the origin of protoxide of iron in the mineral, *Raseneisenstein*\*.

The dark colour of the precipitates which these acids produce with the salts of iron, may be attributed chiefly to those of the protoxide. Sometimes, however, coloured combinations are formed, containing perhaps only protoxide of iron. Thus, for instance, if the salts formed by a combination of these acids with alkalis be mixed with a fresh solution of sulphate of iron, or if a salt of protoxide of iron is mixed with an organic acid, and at the same time with a neutral acetate of an alkali.

The intensely red colour of the salts of sesquioxide of iron produced by meconic acid, might, perhaps, likewise be connected with a change of the state of oxidisement of the iron. The blue precipitate, however, appears only some time after ferrocyanide of potassium has been added to the reddened solution of sesquichloride of iron.—*Archiv. d. Pharmacie*.

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ART. V.—*Action of Cyanide of Potassium on Metallic Oxides and Metallic Sulphurets in the Moist Way.* By M. HAIDLEN and M. R. FRESSENIUS.

FOR all the salts we examined in this way an aqueous solution was of course employed. We ascertained that generally the process was unaffected by the acid with which the oxides were combined, and also whether an excess of acid prevailed in the solution or not.

1.—*Potassa, soda, and ammonia*, did not undergo any change.

2. *Lime, Barytes, Strontian*.—If cyanide of potassium be added to the aqueous solution of either of the salts of these bases, a white precipitate of carbonate of lime, barytes, and strontian, is produced. The cause of this precipitate is the carbonic acid

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\* *Raseneisenstein*—a mineral found in alluvial land, in the form of nearly solid brownish-yellow porous masses—is an hydrated oxide of iron, contaminated with foreign matters, especially phosphate of iron.—*Berselius's Lehrbuch*, Band iii. S. 415.

of the alkali, produced by the decomposition of the cyanate of potassa contained in the cyanide of potassium. The complete separation of the carbonated alkaline earth is assisted by boiling. Cyanide of potassium has not the least action on them—that is to say, the precipitate produced is as insoluble in a solution thereof as in water. If cyanide of potassium is not added in quantity sufficient to precipitate the before-mentioned oxides completely in the shape of carbonated salts, a portion of it remains dissolved as a metallic cyanide, which, however, by exposure to the atmosphere, or still more rapidly by heating, is transformed into a carbonated salt.

3. *Magnesia* behaves similar to the alkaline earth, with this difference only, that by decomposition of the cyanide of potassium an ammoniacal salt is always produced, which must be decomposed by boiling with carbonate of potassa before it can be completely precipitated.

4. *Alumina* is completely precipitated. The precipitate of hydrated alumina is perfectly insoluble in an excess of cyanide of potassium, without the application of heat. By heating a part is dissolved, which may again be precipitated by hydrochlorate of ammonia.

5. *Manganese*.—If to a solution of cyanide of potassium a solution of protoxide of manganese is added in very small proportions, the liquid assumes a clear brown-red hue. By the further addition of the salt of manganese, a dirty reddish-yellow voluminous precipitate of cyanide of manganese is produced, soluble in a considerable excess of cyanide of potassium. The brown-red fluid thus produced, from which no cyanide of manganese can be disengaged by acids, is a solution of manganocyanide of potassium. Exposed to the air, it loses its colour, and is decomposed, disengaging hydrated oxide of manganese. Recently precipitated sulphuret of manganese is dissolved with some difficulty by a great excess of cyanide of potassium and heating. The feebly yellow red-coloured solution contains manganocyanide of potassium and sulphuret of potassium. If muriatic acid is added to it in excess, sulphureted hydrogen and prussic acid escape, chloride of manganese remaining in the solution.

6. *Iron*.—In a solution of the salts of protoxide of iron, cyanide of potassium produces a yellowish red precipitate, which requires for its solution a large quantity of cyanide of potassium in excess. By the addition, however, of caustic potassa, it is easily and quickly taken up. The liquid contains ferro-cyanide of potassium, whose reaction is sufficiently known. Cyanide of potassium produces, in a solution of the salts of peroxide of iron, a reddish brown precipitate similar to the hydrated peroxide of iron, which, even if cyanide of potassium be added in great excess,



is not completely dissolved. The liquid contains ferro-cyanide of potassium. Recently precipitated sulphuret of iron is dissolved with difficulty in a large excess of cyanide of potassium: by the aid of heat, and the addition of caustic potassa, solution takes place easily and quickly. The yellowish brown coloured liquid then contains ferro-cyanide of potassium and sulphuret of potassium.

7. *Cobalt*.—By adding cyanide of potassium to a solution of a salt of protoxide of cobalt, a dirty yellow, flaky precipitate of cyanide of cobalt is obtained, which completely dissolves in an excess of the precipitant. By heating the solution, if free prussic acid is present therein, cobalto-cyanide of potassium is formed, which undergoes no change by the action of dilute acids or of alkalis. Recently precipitated sulphuret of cobalt dissolves in cyanide of potassium when heated; the solution assuming a brownish colour. If to the solution an acid is added in excess, sulphuretted hydrogen and prussic acid are evolved. The solution contains cobalto-cyanide of potassium.

8. *Nickel*.—By mixing a salt of oxide of nickel with cyanide of potassium, a pale green, flaky, gelatinous, and easily depositing precipitate of cyanide of nickel is produced, which redissolves with facility in an excess of the precipitant. The yellow solution contains a double combination of cyanide of nickel with cyanide of potassium. Muriatic acid, sulphuric acid, and nitric acid, remove the precipitate by decomposing the cyanide of potassium. The precipitation is never perfect; whether the precipitation takes place in a cold or hot solution, a portion of nickel always remains dissolved. Acetic acid does not decompose the double cyanide of nickel with cyanide of potassium. Recently precipitated sulphuret of nickel easily dissolves when heated with a solution of cyanide of potassium. The colourless solution evolves sulphuretted hydrogen and prussic acid, on the addition of acetic acid, without becoming turbid. If, however, a mineral acid is added, a precipitate of cyanide of nickel is simultaneously produced.

*Zinc*.—Oxysalts of zinc exposed to the action of cyanide of potassium produce a white gelatinous precipitate of cyanide of zinc, which very easily dissolves in cyanide of potassium, forming double cyanide of zinc and cyanide of potassium, from which the simple cyanide may be reproduced by acids. If, however, they be added in excess, (acetic acid not excepted) it is redissolved. Carbonate of zinc also easily dissolves in cyanide of potassium. Recently precipitated sulphuret of zinc treated with a solution of cyanide of potassium gives a colourless clear solution, which contains, besides sulphuret of potassium, the previously described double combination of cyanide of zinc with cyanide of potassium. Acetic acid precipitates a part of the

zinc as sulphuret of zinc from the solution ; evolving at the same time prussic acid and sulphuretted hydrogen.

10. *Cadmium*.—By adding cyanide of potassium to the solution of a salt of oxide of cadmium, a white precipitate of cyanide of cadmium is obtained, which behaves precisely similar to the cyanide of zinc. Sulphuret of cadmium is insoluble in cyanide of potassium. If, therefore, sulphuretted hydrogen is added to a solution of the double salt of cadmium with cyanide of potassium, all the cadmium is precipitated as sulphuret of cadmium.

11. *Lead*.—By adding cyanide of potassium to the solution of a salt of oxide of lead, a heavy, granulated, easily depositing, white precipitate is obtained, which is easily separated by filtration, and cleaned by washing, without difficulty. If the cyanide of potassium is added in sufficient quantity, no lead can be detected by sulphuretted hydrogen added to the filtered liquid. The precipitation is assisted by heat. The precipitate is insoluble in an excess of the precipitant, as also in water. It contains no water. By nitric and acetic acids it is easily dissolved, giving off carbonic acid. If the lead is precipitated from the solution by sulphuretted hydrogen, a small residue of a salt of potassa remains after evaporating the filtered solution. The sulphuret of lead is entirely insoluble in cyanide of potassium, even when heated.

12. *Bismuth*.—Oxide of bismuth and sulphuret of bismuth behave exactly like the corresponding combinations of lead. The precipitate produced by cyanide of potassium in solutions of bismuth is white, heavy, and easily separated by filtration. The filtered solution contains in like manner some potassa.

13. *Uranium*.—If a small quantity of a solution of oxide of uranium is poured into a solution of cyanide of potassium, a clear yellow solution is obtained. By adding more oxide of uranium, a yellow precipitate of cyanide of uranium is produced. The latter dissolves only in a very large excess of cyanide of potassium by heating. Acids do not produce any precipitate in the yellow solution.

By this reaction, which uranium possesses in common with iron, cobalt, &c. as also by some other circumstances, we were induced to suppose that there must exist a combination of uranium corresponding to the ferro-cyanide of potassium, the cobalto-cyanide of potassium, &c.; and with a closer examination of this we are at the present moment occupied.

[To be continued.]

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ART. VI.—*On the Preparation of Oxalic Acid*. By SCHLESINGER. By following the process recommended by Berzelius, 1875, by that of Mitscherlich, 25 per cent. of crystallized oxalic acid is

obtained. That of Geiger requires the greatest attention and much time, without furnishing a larger quantity or better product. If oxalic acid, prepared according to one of these prescriptions, is placed for drying on white blotting paper, the mechanically adherent moisture separates only very slowly therefrom; and, even after this, it will assume a yellow or brown colour at a temperature of  $+ 50^{\circ} \text{R.} = 144.5^{\circ} \text{F.}$ , and if exsiccated does not yield a white powder. If exsiccated, recrystallization does not always procure an oxalic acid which easily dries and remains uncoloured. The reason of this disposition of oxalic acid to become so easily decomposed, is caused by the small quantity of nitric acid employed in preparing this body. If sugar, starch, &c. are, at the commencement of the process, treated with a larger quantity, especially of concentrated nitric acid, than the before-mentioned formulæ indicate, not only a considerably greater quantity of crystallized oxalic acid will be the result, but it quickly dries and decomposes when exposed to the atmosphere, without assuming any colour. If oxalic acid has, therefore, been prepared according to the above-mentioned formulæ, the remaining ley only requires to be boiled with nitric acid of 1.38 specific gravity until the nitrous acid fumes cease to be evolved, which are then allowed to crystallize, and at each repetition of this operation beautifully crystallized oxalic acid may be obtained, and even the last drops of the original fluid are converted into crystals. During this treatment care must be taken that there is always a sufficient quantity of nitric acid; a certain proof of which is, that the fluid remains clear, like water of a pale yellow, evolving nitrous acid vapours; if the mixture contains insufficient nitric acid, it first assumes a dark yellow, then brown, and finally black colour. All the crystals obtained in this manner are to be redissolved by boiling them, whilst still moist, in double their weight of distilled water, sharpened with nitric acid; the solution is then filtered whilst hot, set aside, and after a few hours the whole vessel will be filled with oxalic acid. The mother liquor is next decanted off from the crystals, then concentrated by evaporation, and again set aside to produce more crystals. The oxalic acid thus obtained is put into a glass funnel for the purpose of draining, and then dried on white blotting paper, at the ordinary temperature of the atmosphere, when it remains slightly contaminated with nitric acid.

The writer next instituted the following experiments: one part, by weight, of sugar, was heated to boiling with 2, 4, 6, 8, 10, and 12 parts, by weight respectively, of nitric acid of 1.38 specific gravity, in beakers or goblet glasses, lightly covered with plates of glass; the operation was conducted over a small spirit lamp, until each liquid was reduced, by evaporation, to a like volume, after which they were exposed, during the night, to

a temperature of  $-4^{\circ} = 23^{\circ} \text{ F.}$  For each of these experiments 3.042 grammes, = about 45 grs. of dry sugar, were employed, and the cooled liquids were found as follows:—

*a. 1 part of sugar, with 2 parts of nitric acid,* yielded a syrup-like colourless liquid, without crystals; on slightly heating, it became yellow, then brown, and finally black.

*b. 1 part of sugar, with 4 parts acid.* The mass was likewise colourless and syrup-like, mingled however with a few crystals of oxalic acid. By heating, it also became yellow, brown, and then black.

*c. 1 part of sugar, and 6 parts acid.* The whole mass appeared colourless and crystalline; by touching it, however, with a glass rod, a tough thick lump of crystal was formed, which did not dry, and by heating it likewise became yellow, and then brown.

*d. 1 part of sugar, with 8 parts nitric acid,* yielded beautiful laminated crystals. On white blotting paper they dried somewhat slowly, and adhered together, inducing the supposition that foreign matter was still mixed with them. Dried in the atmosphere they weighed 1.872 grammes, or 62 per cent., = about 30 grs. Exposed to a temperature of  $100^{\circ} = 257^{\circ} \text{ F.}$  these crystals effloresced, and assumed a yellowish tinge, and then weighed 1.242 grammes = about 19 grs.

*e. 1 part of sugar, with 10 parts acid,* gave likewise colourless crystals, without any mother liquor, weighing 1.562 grammes = about 23 grs., or 52.37 per cent., and effloresced more rapidly than the preceding, after which they weighed 1.117 grammes = about 17 grs.

*f. 1 part of sugar, with 12 parts acid,* gave 1.357 grammes = about 21 grs. of very beautiful, exceedingly brilliant, large laminated crystals, which dry very rapidly on paper, completely yielding up, within an hour, at  $100^{\circ} = 257^{\circ} \text{ F.},$  their two atoms of water, without losing their crystalline shape, only becoming opaque, and then weighing 0.359 grammes = nearly 5 grs.

The three last experiments were repeated with somewhat larger quantities of sugar.

237.5 grammes =  $366\frac{1}{2}$  grs. of nitric acid were poured over 29.69 grammes = 458 grs. of dry sugar, in small lumps, at a temperature of  $+3^{\circ} = 39^{\circ} \text{ F.}$  After some minutes the liquid round the sugar assumed a pale-reddish colour, which, by warming to  $12^{\circ} = 59^{\circ} \text{ F.},$  changed into a pale-yellow. At  $35^{\circ} = 111^{\circ} \text{ F.},$  the sugar was liquefied, having a yellow tint, whilst the nitric acid standing over it was as clear as water. At  $45^{\circ} = 134^{\circ} \text{ F.},$  the whole fluid was rendered yellow, and a feeble evolution of nitrous acid gas gradually commenced. At  $55^{\circ} = 156^{\circ} \text{ F.},$  the liquid became of a greenish-yellow colour; at  $60^{\circ} = 167^{\circ} \text{ F.},$  olive-green; at  $65^{\circ} = 179^{\circ} \text{ F.},$  it appeared scarcely

transparent; at  $70^{\circ} = 190^{\circ}$  F., quite opaque, and at this point the most violent action ensued. At  $78^{\circ} = 208^{\circ}$  F. the violence decreased, the liquid at the bottom of the glass again became yellowish-green; at  $80^{\circ} = 212^{\circ}$  F., quite transparent and bright; at  $89^{\circ} = 232^{\circ}$  F., the evolution of nitrous acid gas, in small bubbles, proceeded steadily. Commencing at  $70^{\circ} = 190^{\circ}$  F., the temperature spontaneously increased by the heat evolved during the process of decomposition until it reached  $90^{\circ} = 234^{\circ}$  F., without the aid of the flame of the spirit lamp. When the latter was again employed, the fluid continued to boil uniformly, the greenish-yellow colour passed into a dark yellow, and from  $92^{\circ}$  to  $96^{\circ} = 239^{\circ}$  to  $248^{\circ}$  F., into a golden-yellow colour, and then the thermometer descended to  $85^{\circ} = 223^{\circ}$  F., at which point feeble action continued for some time.—*Ph. C. Bl.*

[To be continued].

ART. VII.—*On the Analysis of Osgall, and the Characteristic Properties of its Elements.* By the Baron J. BERZELIUS.

[From the Kongl. Vet. Acad. Handl.]

[Continued from page 103.]

THE solution is then diluted with water in a large bottle till it begins to grow milky, and this addition of water is continued so long as the solution is rendered turbid thereby. The liquid is then left undisturbed for twenty-four hours, or longer; meanwhile oily drops of a brownish colour collect on its surface, which are separated by filtering through a previously moistened filter, and afterwards removed from the paper by solution in spirit of wine.

The fluid which has passed through is then left undisturbed during 24 hours in a temperature of  $+ 80^{\circ} = 176^{\circ}$  F., during which time still more unctuous matter is disengaged, but this is a soft, viscous, nonfluid mass, and the fluid is not rendered perfectly clear even if again filtered. When heated to the boiling point it becomes much more turbid; but in cooling it again grows as clear as before this operation. I have not been able to remove all the fatty matter in this manner, but have succeeded in getting rid of the greater part of it: so advantageous is it to effect this, that notwithstanding an acceleration of change in the gall might justly be apprehended by the protracted influence of heat, yet have I preferred this mode of proceeding to allowing the fatty matter to remain in the solution.

The solution of oily matter in spirit of wine is mixed with a little carbonate of potassa, so as to form a combination, not too concentrated, and evaporated; in order to effect the removal of the spirit of wine during this operation, brown-coloured elain,

in less quantity than the oil employed, is disengaged. By mixing the alkaline solution with an acid, margaric and stearic acids are deposited, and these are separated in the ordinary way. Ether disengages a trace of choleic acid therefrom, which remains undissolved.

The few drops of elain are easily soluble in proof spirit; they possess, generally, the same properties as elain prepared from ox tallow, and may be converted into a soap, with the formation of glycerin, oleic and margaric acids, but they contain no choleic acid.

The fat separated during heating is a mixture of oleic, margaric, stearic, and choleic acids. The last remains undissolved if the mass be treated several times successively with ether, which dissolves the fatty acids, and leaves behind the choleic acid in the form of a semifluid magma, which is dissolved in carbonate of potassa, and precipitated therefrom by muriatic acid. The ethereal solution is much coloured by the oleic acid.

When the aqueous solution has been in this manner freed as much as possible from fat, it is then digested in an open vessel over a water-bath, and well mixed with pure fresh precipitated oxide of lead, (which, after having been deposited, is allowed to remain in one part of water). The oxide of lead is added in small portions, and only after the previous portions have been converted into a plastic mass, must any addition be made; and this is continued until the addition of oxide of lead ceases to cause the formation of this mass. Towards the end of the process the liquid should be decanted into another vessel, wherein its complete saturation with oxide of lead can be effected, because the free oxide of lead unites with the semifluid mass, and the point of saturation cannot then be ascertained so easily. When the oxide of lead, after digestion for half an hour in the liquid, can be rinsed therefrom, all the parts which can combine with oxide of lead are actually precipitated, after which the liquid is allowed to cool, and then filtered.

During this proceeding, bilifellic and bilicholeic acids combine with the oxide of lead, forming a plastic mass, whilst the free bilin remains in the solution, together with those substances which resemble the extractive matter of flesh, and are soluble in anhydrous spirit of wine.

The combination of lead is repeatedly kneaded in boiling water, adding the latter gradually, and in small portions, in order to extract therefrom the adherent solution of bilin.

The solution of bilin is filtered and evaporated to perfect dryness in a water-bath, so that the residue breaks into pieces, and is then dissolved in anhydrous spirit of wine. By this process a small quantity of white matter, containing lead, generally remains undissolved, which is separated by filtration, and from

which still more will separate from the clear filtered solution if it remains standing for a couple of days. Evaporated to dryness, the clear solution leaves bilin, coloured of a yellowish tinge by the above-mentioned spirituous extract. The test that the bilin is pure is this:—its solution in spirit of wine does not become turbid on the addition of a little sulphuric acid, which precipitates therefrom oxide of lead as other bases. If this test is applied before the white matter is deposited, a small precipitate of lead is commonly obtained both by sulphuric acid and sulphuretted hydrogen. This white matter will be the subject of future consideration.

The combination of oxide of lead, which is brittle when cold, is rubbed to powder, treated with spirit of wine of 0.833, digesting at a moderate temperature, the solution decanted, and the digestion repeated by the further addition of spirit of wine; this is continued until the spirit of wine ceases to extract any matter therefrom. A pulverulent oxide of lead then remains behind, which is now extracted by boiling it with a solution of bicarbonate of soda or potassa.

A. *The solution in spirit of wine* is submitted to distillation over a water-bath to a certain point, but not so far as that the dissolved matter may begin to be disengaged. The lead is then precipitated by sulphuretted hydrogen, the liquid filtered, the sulphuret of lead washed with spirit of wine, containing a little sulphuretted hydrogen, the solution distilled\* with the heat of a water-bath, and finally evaporated to perfect dryness.

The residue is treated with anhydrous spirit of wine, when it leaves behind undissolved taurin. For this purpose the mass ought to be well dried, and the spirit of wine perfectly anhydrous, because the taurin, if other matters be present in spirit of wine, is thereby dissolved, whereas pure taurin does not dissolve in pure anhydrous spirit. This principle is not contained in fresh gall; but, during the process here laid down, the bilin undergoes a change, whereby more or less taurin remains undissolved, which is washed with spirit of wine.

The spirit of wine is removed by distillation; the liquid, reduced to the consistence of syrup, must be put into a glass retort, and ether quite free from spirit of wine poured over it; if it contains water it is immaterial. The retort is connected in the ordinary manner with a Liebigian refrigerator†, and the ether boiled till half its quantity has passed over; the mixture is then allowed to cool, and the ethereal solution decanted. The residue

\* The distilled spirit contains sulphuretted hydrogen and sulphuret of ethyl, from which it can easily be freed by agitating it with recently precipitated oxide of lead.

† A glass tube in an inclined position, surrounded by a larger glass tube, through which cold water can be introduced slowly streaming from beneath, whilst the distilled liquor flows out from the narrow tube. The warm water flows out from the upper part, where the vapours in the narrow tube begin to condense.

is treated once or twice, or as often as may be necessary, to entirely remove all matters soluble therein.

The explanation of this operation is as follows:—The liquid treated with ether is bilifellic acid, mixed with bilicholic acid. The ether extracts these acids partly, leaving behind an aqueous solution of the same acids, combined with a large proportion of bilin, (probably double the quantity,) from which ether is not able to extract any more.

I must add, that if, previous to the ether being added, a few drops of sulphuric acid, proportionate to the quantity of the mass, be mixed therewith, but to such a degree only that no precipitate is produced, the action of the ether will be more powerful, since the liquid then contains a combination of bilin with sulphuric acid, which disengages a portion of the gall acids from their combination therewith. Since, however, sulphuric acid contributes to the decomposition of the bilin, I have not named its addition as a desirable method of analysis, but only as an expedient; if the object is to obtain, for instance, much free fellic acid. Ether does not absorb any sulphuric acid from the liquid.

[To be continued.]

#### ART. VIII.—*Remarks on the Organic Radicals.*

By Dr. T. SCHIEL, of Heidelberg.

THE radicals of those bodies which are commonly designated as alcohates form not only a very simple and regular series, but a corresponding regularity may also be traced in their properties. I confine myself at present to the following remarks, hoping hereafter to return more fully to this subject.

If the combination of carbon with hydrogen,  $C_x H_x$  (in which H signifies one equivalent of hydrogen) be designated by R, then is

|            |            |              |
|------------|------------|--------------|
| $R_1 H$    | = Methyl   | or Methule.  |
| $R_2 H$    | = Aethyl   | " Ethule.    |
| $R_3 H$    | = Glyceryl | " Glycerule. |
| $R_4 H$    | = (?)      |              |
| $R_5 H$    | = Amyl     | " Amule.     |
| $R_6 H$    | = Cetyl    | " Cetule.    |
| $R_{24} H$ | = Cerosyl  | " Cerosule.  |

I have not hesitated to add to this series Cerosyl, as the radical of Cerosyn, which, according to Dumas, has the composition  $C_{24} H_{50} O_2$ , since it cannot be doubted that the combinations of this radical can be produced from Cerosyn, which justifies such assumption. Want of materials alone prevented me from undertaking an examination of this interesting body.

If the boiling points of the hydrated oxides of the radical are compared with each other so far as Amyl, (which are also vola-



tile combinations,) they will be observed to increase with every atom of R by  $18^{\circ} = 32.4^{\circ} \text{ F.}$  Thus the boiling point

Of hydrated oxide of Methyl is  $60^{\circ} = 140^{\circ} \text{ F.}$

” ” Aethyl  $78^{\circ}.4 = 173^{\circ} \text{ F.}$

” ” Amyl  $132^{\circ} = 78 + 3 + 18^{\circ} = 271^{\circ} \text{ F.}$

In the above series Glyceryl takes its place according to the formula  $\text{C}_3 \text{H}_4 \text{O}_3 + \text{aq.}$ : this combination does not, however, coincide with the general formula for alcohates, which is  $\text{Rx H O} + \text{aq.}$  The researches which were undertaken by Stenhouse, in the laboratory of this town (Giessen), have in reality furnished the formula  $\text{C}_3 \text{H}_4 \text{O}$  for Glycerin; according to which, if we follow this chymist, its decomposition into carbonic and formic acids, when treated with peroxide of manganese and sulphuric acid, bears a very simple explanation. This body, which in other respects differs from the alcohates, would not, therefore, belong to this group. It is certain that, in organic chymistry, several other series, similar to the above, might be arranged.—*Liebig's Annalen.*

#### ART. IX.—*On the little attention given to Practical Suggestions.*

*To the Editors of the Annals of Chymistry and Pharmacy.*

“*Salus populi lex suprema est.*”

SIR,—In every art there are some little practical points which are apt to escape the notice of many whose attention is, perhaps, too exclusively engaged on great principles and general results. Such, who may be excessively scientific, are sometimes sadly disappointed that the results of their labours are not superior, if equal, to their less scientific but more practical competitors. I have sometimes been more grieved than amused by the contempt with which a practical suggestion has been treated as a thing of no importance; and because, forsooth, the proposer could not explain it according to any recognised theory, it has hence been considered of no consequence, whilst, in fact, on it depended the success of a process.

Now I think it would be advantageous to the pharmaceutical world to be put in possession of the little unaccountable things that are observed in manipulation, leaving them to be explained by the more learned. I well know where the delicacy rests; it is in the observer's want of confidence in his own knowledge. He does not like to publish it, lest his fact may be familiar and easily explained by some rival, ready to turn it against his reputation. In your valuable journal you afford a safe medium for such communications. Their value can be tested, the author remaining concealed until the importance of his observation is established.

I would lead the way by an observation on the mode of making infusions; and this applies more especially to those ordered in prescriptions in

small quantities, such, for example, as eight ounces. Now, if the prescription should be prepared by different pharmaciens, it may differ so much in its sensible properties and physiological effects, as to lead the patient to the rational conclusion that there must have been a mistake somewhere.

Complaints are made to both establishments, where it is declared upon honour, *and with truth*, that the medicine has been put up in strict accordance with the prescription. Now, what is the cause of the difference? Simply this: in one case the manipulator has taken a practical lesson from his mother, who, when she makes tea, always pours into the teapot some hot water, and empties it out before putting in the tea;—he takes the hint, and does the same when he makes his infusions, especially if they be delicate ones, small in quantity, and to stand for a short time, and in cold weather. The other, perhaps, on a sharp frosty day, puts his ingredients into a cold stone pot, and pours upon them the half of a pint of boiling water; he lets it stand the proper time, and strains it off, being fully confident that he has made his infusion *secundem artem*. This I give in illustration of the general observations with which I started, and I think it sufficient to show, that great difference in results may arise from inattention to little things.—I am, Gentlemen, your obedient servant,

London, 22d October, 1842.

Q. X.

#### ART. X.—*Presence of Nitrogen in Sugar.*

*To the Editors of the Annals of Chymistry and Pharmacy.*

GENTLEMEN,—Can you, or any of your correspondents, inform me, whether, in any published analysis of Sugar, *nitrogen* has ever been given as one of the components of this substance.

My reason for asking this question is, because I have several times, when conducting a qualitative analysis of sugar, detected traces of it.

The following very simple experiment will show the truth of this. Ignite, in a platinum spoon, a few grains of sugar, and receive the vapour which it gives off on a slip of glass, previously moistened with pure muriatic acid; this being evaporated to dryness, leaves a residuum which, when examined under the microscope, consists almost entirely of crystals of *muriate of ammonia*.

I should like to receive some explanation of this, because I cannot imagine that so appreciable (although so small) a quantity, can have escaped the notice of the eminent chymists who have analysed sugar.

I am, Gentlemen, your obedient servant,

Aylesbury, October 23, 1842.

THOMAS DELL.

[The result of Fremy's experiments on the decomposition of sugar with lime, gave water, carbonic acid, acetic spirit, and metacetone. The

formula furnished by Berzelius is  $C_{12} H_{20}$ , Oxygen 10; whilst that of crystallized sugar, with one atom of water, is  $C_{10} H_{22}$ , Oxygen 11.—(*Berzelius, Lehrbuch*, Woehler's ed. vol. vi. p. 427.) Liebig, in his *Organic Chemistry* (p. 487, French edition), has the following passage, with the name of Magendie as the authority:—"Sugar is nutritive, if accompanied with other alimentary substances; but as it *does not contain azote*, it cannot alone support life." The formula, according to the same author, is  $C_{12} H_{18} O_9 + 2 \text{ aq.}$ —ED.]

## PRACTICAL PHARMACY.

### ART. XI.—*Pharmaceutical Remarks on Iodide of Iron.*

By Dr. GEISLER.

THE writer of this article, who keeps, according to the advice of Wackenroder, a concentrated syrup of iodide of iron in stock, follows, for the preparation of it, a process somewhat different from that of Wackenroder.

Instead of finely-prepared metallic iron, he in general employs pure iron filings; and as, in the proportion of 1 part to 3 parts of iodine, these act very slowly, he takes equal parts of iron and iodine, using water as the medium of contact for these elements. If 6 drachms of distilled water are poured into a flask containing 3 drachms of iodine and an equal quantity of iron filings, in a few minutes a fluid will be obtained almost colourless, and scarcely tinged with green. This is then filtered, and the residue washed with an equal volume of water, so that the weight of the whole fluid amounts to 12 drachms. Agitated with 18 drachms of pure white sugar, finely pulverized, a syrup is formed, which at first has the appearance and consistency of almond syrup; afterwards, however, it becomes as clear and nearly as colourless as *syrupus simplex*, being tinged with a slight green. Each drachm of it contains 6 grains of iodine, or rather an amount of iodide of iron corresponding to that quantity; that is to say, 7.288 grains. It is therefore one-half weaker than that prepared according to the prescription of Wackenroder.

The advantages of this method of preparing it may be enumerated as follows: 1stly, the combination of the iodine with the iron is very quickly obtained; 2dly, heating is avoided, and therefore the syrup will keep better; and, 3dly, the preparation of diluted syrup of iodide of iron, which is made to contain in every ounce 3 grains of iodine, or 3.644 grains of iodide of iron, can be managed with sufficient accuracy by mixing half a drachm of the concentrated syrup with  $7\frac{1}{2}$  drachms of simple syrup.

As soon, however, as the concentrated syrup of iodide of iron begins to assume a brownish-yellow colour, (which is often the case with that prepared by heating, immediately on completion of the process), it contains traces of free iodine\*. These may be discovered by a solution of starch, which is not at all coloured by iodide of iron, but instantly by iodine; which, according to the greater or smaller quantity that exists, is tinged with a dark or light violet colour. The following test is equally distinct:—One drop of tincture of galls is mixed with two drachms of distilled water, and one drop of the solution of the iodide of iron poured into the mixture. If it causes, at the moment of entering the mixture, a pure white precipitate, which turns blue only afterwards, the solution contains neither free iodine nor oxide of iron; which, however, is the case if a blue colour is perceived immediately on the addition being made.

The concentrated syrup of iodide of iron, prepared without the aid of heat, keeps for about a fortnight without changing. It then begins to assume a yellowish hue, and to impart a slightly violet colour to a solution of starch. The decomposition of the liquid iodide of iron is almost equally well prevented by gum-arabic as by sugar. If the above proposed preparation of concentrated syrup of iodide of iron, amounting to 12 drachms, is mixed with a solution of one ounce of gum-arabic in ten drachms of distilled water, a syrup-like mucilage slightly approaching to green is obtained, each drachm of which contains six grains of iodine, and which keeps for several weeks without change.

The iodide of iron cannot be prepared in a solid form without change, even by the addition of sugar. During evaporation, free iodine is evolved. The method proposed by Kerner for preventing the decomposition of iodide of iron has been employed by the writer, thus modified:—He evaporated one drachm of the concentrated syrup of iodide of iron with half a drachm of milk-sugar, in a porcelain cup, over a water-bath, until the hot mass could be taken out of the vessel when of a pilular consistence. But I did not succeed in pulverizing it without a further addition of milk-sugar; which, when added until the weight of the whole amounted to two drachms, a white powder was obtained by continually rubbing. This could be preserved in a well-closed flask for a month without formation of free iodine. Enveloped in paper it grows moist; after some time brown, and then

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\* The writer of the preceding truly practical paper assumes, that when iodide of iron in solution is decomposed, that a sub-iodide is formed; but as we are perfectly of opinion with Mr. Squire (whose paper we have given in the present No. in justification of the course we have pursued), that free iodine is given off, whilst oxide of iron is precipitated, we have ventured to modify the preceding paper to these views, not accepting the terms iodide and ioduret of the original writer.—Ed.

consists of free iodine, oxide and iodide of iron. Each drachm of this powder contains a quantity of iodide of iron equivalent to three grains of iodine.

Iodide of iron may be easily formed into pills by heating one drachm of the concentrated syrup of iodide of iron, or the mucilage of iodide of iron, with one drachm of sugar of milk, in a steam-bath, until the mass has assumed the consistence of a pill-mass. The application of heat ought not to be continued for a long time, otherwise the mass grows hard. From the quantity indicated, sixty pills are formed. Each pill then contains a quantity of iodide of iron, equivalent to 1-10th grain of iodine. One drachm of syrup of iodide of iron, or a similar quantity of the mucilage of iodide of iron, forms, with two drachms of marshmallow root in powder, a very good mass for pills; which, when formed into ninety pills, each of them contains an amount of 1-10th grain of iodine. It is of course understood that both kinds of pills must be kept in well-closed bottles, in which they keep for weeks without change; exposed to the free influence of the atmosphere, they soon decompose, evolving free iodine, and depositing oxide of iron.—*Archiv. d. Pharmacie.*

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ART. XII.—*On the Periodide of Iron.*

HAVING noticed in our recent chemical works an account of a periodide of iron, and the method adopted for its preparation being to expose the protiodide in solution to the free action of air, I have presumed to offer an opinion, and I do apprehend that the change in this case which takes place is a peroxidation of a part of the iron which falls, and its equivalent of iodine is left *free* in the solution of the yet unchanged protiodide of iron, and a portion remains thus unchanged after a thin stratum has been exposed several weeks, which a solution of potash will indicate by precipitating a protoxide of iron; but there is no periodide of iron in this solution, nor could I form a periodide by a persalt of iron and iodide of potassium, and I believe no such compound to exist.—Mr. SQUIRE, in *Phil. Mag.* July, 1836.

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ART. XIII.—*On the Leaves of the Cassia Senna from Mecca.*  
By Dr. THEODORE MARTIUS.

IN my Handbook of Pharmacognosy, I have mentioned the senna leaves from Alexandria, Tripoli, and the East Indies, as the sorts which are chiefly sold in Germany. At that time it was generally believed that senna leaves were invariably obtained from Africa; and I supposed that the senna leaves of Tinnevely, as they were termed, and which were occasionally received, must originate from the same country, although brought to us from the East Indies. In this opinion I was confirmed

chiefly by the information of Adams, who reports that the Indian senna leaves are imported into the East Indies from the Persian Gulf. As I had succeeded in several instances in ascertaining the origin of a drug from its native name, I was glad to hear from Professor Friedrich Rueckert, then resident here, that Tinnevely might be interpreted "thin senna of the Nile." The authority of such a linguist only served to confirm my opinion. I have, however, ascertained latterly, that this excellent variety of senna owes its name to that of the East India town, Tinnevely, near Pallankottah, in the Presidency of Madras, and that it is neither imported from the Persian Gulf nor from Egypt.

Since that time, however, as some other sorts of senna leaves have reached us, I have thought this drug might be best classified according to the countries from which it was obtained; perhaps as follows:—

1. African senna leaves.
  - a. Senna from Alexandria,
  - b. Senna from Tripoli,
  - c. Senna from Tunis,
  - d. Senna from Senegal.
2. Asiatic senna leaves.
  - a. Senna from Aleppo or Syria,
    - α. Narrow leaved,
    - β. Broad leaved.
  - b. East India senna ;
    - α. Senna from Tinnevely.
    - β. Ordinary East India senna.
  - c. Senna from Mecca.

Among the African senna leaves, those of Alexandria have been lately received so broken to pieces, and adulterated to such an extent with the leaves of *cynanchum*, that they can scarcely be used. Those from Tripoli are better. The Tunisian seem, on the other hand, to be very rare; whilst senna from Senegal has, so far as I know, been only once imported, as a trial. Among the Asiatic senna leaves, those from Aleppo, as they are distinguished, (first described by Bassermann,) have been imported for about three years. I possess two sorts of this latter variety, which may be easily distinguished from each other. The senna of Tinnevely is so well known, and differs so distinctly, that it can neither be confounded with Mecca senna, nor with that from Aleppo. The ordinary East India leaves, on account of their partial similarity only, might be worthy of consideration.

The senna leaves from Mecca, then, to which the following paper is chiefly devoted, I obtained only a few weeks since, through the kindness of the well-known merchants, Teodorovich

and Stettner, of Trieste. During last year they were imported in large quantities, and in parcels of 500 lbs. Vienna weight, at Trieste. They are not of equal quality in each parcel, as a superficial glance immediately proves; one containing a greater quantity of the narrow leaf, whilst in another broader leaves are observed, although exactly of the same colour, form, and shape—a circumstance which is easily accounted for. According to the obliging communication of the before-mentioned merchants, this Mecca senna has been brought to Egypt from the province of Hedsehas, in Arabia Petræa. It is obtained, if I am not mistaken, from the cassia lanceolata (Torskal). According to the statement of this natural philosopher, this species of cassia is frequently found on the whole of the eastern coast of the Red Sea, as far as the frontiers of Semen. On closer examination I found it possessing the peculiar smell of the senna leaf, but in a more intense degree. The colour is of a much fresher green than the usual East Indian senna found in commerce. Compared with the Alexandrian senna, which during last year only was found to be of a superior description, so far as the German trade was concerned, it is rather grayish-green. Of this Mecca senna two samples have been forwarded to me.

*a. Narrow and small-leafed senna.*—It consists almost throughout of the leaves of cassia lanceolata (Torskal; cassia elongata, Lerner; represented by Nees von Esenbeck as cassia acutifolia). I must however observe, that in the representation given by Nees, the leaves are figured rather larger, and from about the lower third to the base, too tapering. The nerves of the leaf also are not so much bent towards the middle nerve, but approaching more to the border of the leaf. The smaller leaves were fully an eighth of an inch broad by seven-eighths of an inch in length; the larger fully three-eighths of an inch broad by one inch and five-eighths in length. Besides this, the leaves of this plant are distinct, inasmuch as they have short stalks, are linear, lanciform, and whole-bordered, and are terminated by a short stem. Examined through a lens they appear on both sides closely covered with short, small hairs. I must however observe, that on many leaves this cover was less perceptible on one side, especially on the larger ones. Besides these I observed several minute yellow flowers, imperfectly developed. There were proportionately but few stalks, seed-cases, or legumes, and brown leaves. I discovered on the other hand, some leaves of the cassia lanceolata, Lam. (represented by Nees under this name). Besides this, some larger leaves, very probably appertaining to a cassia also, were intermixed: these, found only in very inconsiderable quantity, always appeared rolled over at the borders. A large one, which I measured, was fully half an inch broad, and one inch and a half

long, Bavarian measure. They are, at the same time, very brittle, and not elastic like parchment. The few covers of the legume which I found appeared to be not perfectly matured.

β. This kind, with broad leaves, is especially distinguished by the leaves generally appearing larger. Some few leaves of the cassia lanceolata, Lam. were also found among the variety. There were but few seed-cases, and the whole was but inconsiderably mixed with stalks, stones, &c. In other respects these two sorts of senna leaves, which, by the way, were of the same importation, shewed no other difference. Altogether they agree very closely with the ordinary East Indian senna leaves, and are obtained, according to the statements of the previously mentioned merchants, from the Arabic province of Abu-Arish, bordering on the province of Hedsehas. As the senna leaves from Mecca are almost entirely free from dust, stones, stalks, and other contaminations, I am of opinion that they are not only capable of supplying the place of the Alexandrian senna leaves, but that they will also serve to replace the Indian senna leaves now commonly used among us, to which they are superior in point of odour and colour, as well as from the absence of stones and dust.—*Pharm. Central-Blatt.*

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ART. XIV.—*Syrups prepared with the expressed Juices of Fruits.*

JONAS directs the attention of those who wish to prepare syrups of the expressed juices of fruits, perfectly clear, and so as to keep well, to these two principal points: 1stly, the juice, after separating it from the placenta, must be allowed to ferment till the liquid ceases to deposit flakes on the addition of sulphate of magnesia; that is to say, until the fermentable matter has been completely destroyed. 2dly, that the purest cane sugar must be employed. Beet-root sugar usually contains vegetable casein, a solution of which is precipitated by sulphate of magnesia.—*Archiv. d. Pharmacie.*

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ART. XV.—*On the Expressed Juices.* By GISEKE.

As it cannot be denied that the manner of preserving the fresh juices of herbs by means of spirit of wine, which was first introduced by the Homœopathists, and is now more generally practised, has some advantages over other vegetable preparations, since in this form they are easily preserved for use, and their active principles retained unaltered, I trust that the following tables, showing the proportions between fresh herb, extract, alcoholized expressed juice, and conserve of several of the most important herbs, may be equally useful to the manufacturer, the physician, and the dispenser. Respecting the alcoholized juices,



the data whence have been deduced the statements I am about to make have been drawn from the actual experiments of the writer, and the expressed juice in every case was mixed with one-fifth of its weight of spirit of wine, of 0·840 specific gravity. As to the extracts, the writer recurred to the table formerly published by him; the conserves were prepared according to the formula of Dr. Bley, with one part of fresh herb and two parts of sugar; and the proportionate strength of the dry herb, as compared with the recent plant, was procured from the *Lehrbuch of Practical and Theoretical Pharmacy of Dr. Cl. Marquart*.

| 100 parts of fresh | Furnish dry<br>Herb. | Extract.   | Alcoholated<br>Juice. | Conserve. |
|--------------------|----------------------|------------|-----------------------|-----------|
| Hb. Aconiti        | 20 parts             | 4·75 parts | 60 parts              | 300 parts |
| „ Belladonnæ       | 12½ „                | 3·66 „     | 81 „                  | 300 „     |
| „ Chelidonii       | 20 „                 | 5·20 „     | 78 „                  | 300 „     |
| „ Conii mac.       | 14 „                 | 4·75 „     | 78 „                  | 300 „     |
| „ Digitalis        | 25 „                 | 4·66 „     | 72 „                  | 300 „     |
| „ Gratiolæ         | 20 „                 | 3·60 „     | 60 „                  | 300 „     |
| „ Hyoscyami        | 20 „                 | 3·63 „     | 72 „                  | 300 „     |
| „ Lactuc. viros    | 20 „                 | 4·16 „     | 75 „                  | 300 „     |
| „ Stramonii        | 12½ „                | 4·50 „     | 60 „                  | 300 „     |

OR,

|                |              | Powdered Herb. | Alcoholated Juice. | Conserve. |
|----------------|--------------|----------------|--------------------|-----------|
| 1 grain. Extr. | Aconiti      | =4·21 gr.      | 12·63 gr.          | 63·15 gr. |
| 1 „            | Belladonnæ   | 3·41 „         | 22·13 „            | 81·97 „   |
| 1 „            | Chelidonii   | 3·86 „         | 15·00 „            | 57·69 „   |
| 1 „            | Conii mac.   | 2·93 „         | 16·42 „            | 63·15 „   |
| 1 „            | Digitalis    | 5·36 „         | 15·45 „            | 64·38 „   |
| 1 „            | Gratiolæ     | 5·56 „         | 16·67 „            | 83·34 „   |
| 1 „            | Hyoscyami    | 5·50 „         | 19·56 „            | 82·81 „   |
| 1 „            | Lact. viros. | 4·80 „         | 18·03 „            | 72·11 „   |
| 1 „            | Stramonii    | 2·78 „         | 13·34 „            | 66·67 „   |

*Archiv. d. Pharmacie.*

#### ART. XV.—PUCHE's Formula for the Exhibition of Cubebs.

*Extractum aquosum liquidum*.—Powder of cubebs is to be kneaded with 1½ times its weight of boiling water to a soft pasty mass; then pressed; and this treatment repeated till the liquid is equal in weight to the cubebs employed: after which one-eighth of rectified spirit of wine is added, and the liquid kept for use.

*Extractum alcoholicum liquidum* is a tincture of cubebs, prepared with alcohol of 22° = 0·923 spec. grav. in the displacement apparatus, the weight of which should be likewise equal to that of the cubebs employed. By mixing equal parts of ordi-

nary syrup and this tincture, and cautiously evaporating the mixture to half its volume, the "*Sirop d'extrait alcoolique de Cubebs*" is produced.

*Capsulae Cubebarum* are prepared either from pure powder of cubebs, or from equal parts of cubebs, Copaiva balsam, and Terebinth. cocta, in the weight of one grain, and covered with Garot-Vée's capsules.—*Journ. de Pharm.*

#### ART. XVI.—*Liquor Opii Sedativus.*

It is matter of sincere regret to every respectable druggist, that so many and so different preparations should be current under the above title. As to their constituents, some we have found to contain potash, whilst others, and these are the majority, have dilute acetic acid for their menstruum.

One formula which has been published directs an acetous extract of opium to be prepared, and a portion of this is to be dissolved (assuming such extract to be double the strength of crude opium), in the relative proportions directed for the *Tinctura Opii P. L.*, employing a more dilute menstruum than the proof spirit of the College.

#### TINCTURA OPII P. L.

Take of hard opium, powdered, three ounces; proof spirit, two pints; macerate for fourteen days, and strain.

#### LIQ. OPII SEDATIVUS (FORMULA PROPOSED.)

Take of the acetous extract of opium, one ounce and a half; or make an acetous extract with hard opium powdered, three ounces; distilled water, one pint and a half; rectified spirits, half a pint; dissolve the extract in the distilled water, add the spirit, and strain.

An aromatic flavour is sometimes communicated by the addition of a few cloves.

The Messrs. Smith, of Edinburgh, have published the following formula for "a watery solution of opium free from narcotine," but which, it must be clearly understood, is about four times the strength of laudanum:—

"Macerate for twenty-four hours any quantity of opium in as much water as will be sufficient to cover it completely, and press the solution through a cloth; digest again for the same time in a like quantity of water; again press out, and repeat the process exactly in the same manner, till the opium has been exposed to the action of seven waters, when it will be sufficiently exhausted. The waters are then to be evaporated to the consistence of a soft extract, the concentration being finished over the water bath, to prevent the active principle being in-

jured by too great a heat. Take up the soluble parts with repeated portions of water, filter, and again evaporate with care to a syrupy consistence. Expose the syrupy extract to the influence of ether, for the purpose of removing the narcotine; after the ether has become saturated, pour it off, and add fresh portions, till on evaporating a small quantity, no solid residuum is obtained. The extract now freed from narcotine is to be heated in a water bath to drive off the ether completely, and digested in alcohol till nothing soluble in that menstruum is left. A large quantity of inert matter will remain, which we have proved experimentally to be quite free from morphia. The alcohol must now be distilled off, and the residuum of distillation dissolved as completely as possible in cold distilled water; a farther portion of inactive pulverulent extractive matter will remain undissolved. The solution, after filtration, is now to be set aside for two or three weeks, when a considerable quantity of solid matter will be found settled to the bottom, from which the liquid must be separated by filtration, and evaporated till about 12 oz. are left for every 4 oz. of opium used; filter, add  $2\frac{1}{2}$  oz. of alcohol, and enough of distilled water to make 16 oz. The solution thus obtained is of a much lighter colour than laudanum, and much more fluid; it is also quite free from any thing nauseous in taste or smell, the taste being only slightly and not unpleasantly bitter, even in the undiluted state. It is also miscible, without muddiness, with watery and spirituous liquids; but of course will be decomposed by all substances which act on the morphia salts, as it contains, if rightly prepared, the full quantity of that principle which an equivalent portion of crude opium would give. This we have proved by precipitating the morphia from the solution, and forming a muriate, when we obtained from a quantity equivalent to 4 oz. of opium between 3 and 4 drachms of the salt, which was nearly white at the first crystallization, having only a slight fawn tinge, and was perfectly free from narcotine. One of us was as completely narcotized *with eight drops of the solution*, as he would have been with about *thirty drops of laudanum*."

This preparation would perhaps be appropriately designated by the title of "Solution of Meconate of Morphia."

The improvement promised by the manufacturers of these preparations is, that they are less stimulating than laudanum, and that less constipation results from their use. Could this be clearly ascertained, they might be allowed to continue unarranged; but we are inclined to attribute to imagination some of the effects referred to an unknown remedy. It is for this reason we write our prescriptions in a dead language, a practice which few young practitioners would have the hardihood to dispense with. James's powder is indebted to much of its reputation

on this account. Most fatal might be the use of the various sedative solutions of opium if their strength varied with the prices demanded for them. We have before us a price-current, in which six shillings a pound is quoted, whilst another well-known pharmaceutical chymist has long been in the habit of charging upwards of twenty shillings for the Liq. Opii Sedativus. When there is no formula given in the Pharmacopœia, by whose dictum the druggist is usually guided, and since it appears there is none for any preparation of this kind in the works emanating from the London, Edinburgh, and Dublin Colleges, we would suggest that the French Codex is not undeserving of a perusal. Here we find the following formula, which, together with the remarks of the talented and practical Soubeiran, we transcribe:—

WINE OF OPIUM BY FERMENTATION.  
(ROUSSEAU'S LAUDANUM.)

|                  |   |   |   |            |
|------------------|---|---|---|------------|
| Take crude opium | . | . | . | 125 parts. |
| White honey      | . | . | . | 375 "      |
| Tepid water      | . | . | . | 1875 "     |
| Fresh yeast      | . | . | . | 8 "        |

Mix the honey with one portion of the water, and knead the opium with the other; mix the two liquors, add the yeast, and set aside in a warm place until fermentation has ceased. Press and strain through a coarse cloth; filter and distil off 500 parts by weight of the liquor. By a second or third rectification of this distilled product, using the heat of steam or a warm bath, 140 parts of alcohol, sp. gr. 903, are to be obtained.

The extractive solution of opium is meanwhile evaporated in a water bath, until there remain 320 parts. The alcohol obtained by distillation is added thereto, and the mixture again filtered. The specific gravity of the solution is .965.

The quantity of alcohol obtained by distillation sometimes varies; for instance, when considerable quantities are made at one time, and when the fermentation goes on favourably; but these variations have no marked influence on the medicinal properties of the resulting wine of opium, provided that the relative quantities of opium used, and amount of product obtained, be strictly observed.

The preceding process is that of Rousseau, modified by M. Blondeau, an intelligent pharmacien of Paris.

Thus prepared, Rousseau's laudanum has a strong narcotic odour of opium, such as will not be found in a spirituous solution of opium where pure spirit is substituted for that obtained by fermentation with opium. With some patients this difference seems to have a peculiar effect.

M. Béral has suggested some modifications of this formula. He augments by 1-15th the quantity of water used in the first

instance: then, when the fermentation has ceased, he withdraws by a single distillation 250 parts of spirit; he evaporates the residue to a like weight (250 parts), and mixes it with the preceding quantity of spirit; he filters after a few days' digestion.

It would appear that the difference consists merely in the more simple relation of the opium to the product; but such is not the case. In two experiments, employing each time 1 kil. 2·205 lb. imp. of Smyrna opium, the same honey, the same yeast, conducting the processes together in the same place, in one and the same stove, I have operated according to the process of the Codex, and according to that of M. Béral. I have observed each time that by the process of M. Béral, when the solution of opium is mixed with the alcohol, there is a muddy precipitate which remains suspended for a long time: this deposit, collected and dried, amounted to 1·40th of the opium employed. It is black, brittle, and resinous. The process of the Codex yields only a minute greyish deposit, which separates with facility. Rousseau's laudanum, prepared, then, according to the process recommended by M. Béral, is a variation from that of the Codex; I do not say that it is an improvement.

[To be continued.]

#### ART. XVII.—*Improvement of Gelatinous Capsules.*

VEE states, that the very sensible inconvenience of contraction whilst drying, which occurs in the manufacture of gelatinous capsules, might be prevented by adding gum and sugar to the jelly. Instead of Garot's gelatinous solution, a solution of one part of gelatine and seven parts of *pasta jujubarum* (Pharm. Gall.) should be employed, which furnishes a quickly drying and agreeably tasting cover, not liable to contract in drying. The *pasta jujubarum* is, according to the Pharm. Gallica, prepared as follows:—"Jujub. libr.; coque e. Aquæ, libr. x. et cola; g. Senegal, libr. vj.; s. i. Aq. libr. xx. et cola: colaturas misce, solve Sacch. pur. libr. v. liquorem, antea clarif. per album ov. No. v.; evapor. ad lib. x. cola, redige ad consist. syrupi; adde Tinct. Cort. Citri, 3j.; denique evapora ad consistentiam extracti mollis," &c.—*Journ. de Pharm.*

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## GALVANISM AND ELECTRICITY.

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#### ART. XVIII.—*Connection between Electricity and Evaporation.*

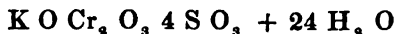
MR. HOWELL, of Oxford, suspended two flat evaporating basins, of 8½ inches diameter, by silk threads, over an oven in daily use, and placed in each of them eight ounces of water, and connected

one of them, by means of a thin copper wire, with the ground. After twenty-five hours, the quantity of water evaporated from the insulated cup amounted to 2 oz. 279 grs., whilst from the non-insulated vessel 3 oz. 144 grs., or 345 grs. more, were evaporated.—*Annals of Philosophy*, vol. xx. p. 45.

ART. XIX.—*On certain Galvanic Series constructed with Chromic Acid.* By T. C. POGGENDORFF.

RECENTLY several parties have employed chromic acid, or rather a mixture of bichromate of potassa and sulphuric acid, as a succedaneum for the nitric acid required in Grove's battery, and have sometimes recommended it chiefly because the vapours arising from the use of the latter acid, and which are sometimes very troublesome, may be thus avoided.

The first application of chromic acid appertains, I think, to Professor Bunsen, who, however, did not find it practicable when charcoal was used as the negative element. It has since been proposed by Dr. Leeson\*, of St. Thomas's Hospital, and Mr. Warrington, of Apothecaries' Hall; and the latter pointed out the very powerful effects to be obtained by the application of platina†. Mr. Warrington deserves likewise the merit of having employed the correct proportion of sulphuric acid to the bichromate of potassa; that is to say, in such a ratio, that the liquid, after the complete reduction of the chromic acid into oxide of chromium has been effected, contains what is called *chromealum*,



which has this advantage, that the precipitation of oxide of chromium is prevented. Hitherto, however, only some early experiments of Mr. W. have been published. Some, in which he promised treating the subject more fully, have not yet been published, and may, perhaps, be delayed for a long time, on account of his appointment to the situation formerly held by the unfortunate Mr. Hennell‡.

I, therefore, believe that the publication of my own observations on this subject will possess some interest for Germany, where the applicability of this new method, or, at least, no detailed exposition, has been brought under the knowledge of the public, more particularly since I can add to them some numerical

\* Phil. Mag. ser. iii. vol. xx. p. 262.

† Ibid. p. 393.

‡ It is known that Mr. H.'s death occurred whilst experimenting with a newly-invented kind of grenade; probably filled with an explosive substance, and destined as an implement of war against the Afghans.

[The kind of grenade referred to was fulminating powder, used for filling percussion-caps, as is well known to the English public; but the reports which reached Germany seem to have confounded the experiments of Mr. Warner, or some horribly destructive implement destined against the Afghans, with the fate of Mr. Hennell.—ED.]

indications which otherwise would not have been so soon developed. I had long since intended to define the value of chromic acid as an excitant of galvanic action, but have been, nevertheless, prevented from so doing by other pursuits, until a recent visit from my friend, Professor Von Ettingshausen, of Vienna, again directed my attention to this object.

The chromic liquid which I employ consists of a mixture of three parts, by weight, of bichromate of potassa; four parts, by weight, of concentrated sulphuric acid; and eighteen parts, by weight, of water. It is nearly at the maximum of concentration at ordinary temperatures, having a sp. gr. of about 1.20, and contains the first two substances nearly in atomic proportion\*. Charcoal (that of Bunsen, the more dense kind), platina, and copper, were then successively immersed in the liquid, separated from the sulphuric acid by a porous clay vessel, whilst the amalgamated zinc was plunged into a mixture of 1 part, by weight, of concentrated acid, and 9 parts, by weight, of water.

For the sake of comparison, a similar series was constructed, consisting of charcoal and platina, with nitric acid of 1.30 density; and also another of copper, with a saturated solution of sulphate of copper of 1.20 density (1 part, by weight, of salt, and 4 parts, by weight, of water).

In all these circles the plates were 1 inch Par. = 1.0658 Eng. broad, immersed  $2\frac{1}{2}$  inches deep, and  $9\frac{1}{2}$  lines from each other. The arrangements of the vessels for containing both liquids were always of the same dimensions, but on account of their peculiar form it might perhaps be difficult to reduce to a precise scale for each fluid the value of the resistances given in the following tables. The liquid of the negative plate was contained in a clay cylinder, which had an interior diameter of  $11\frac{1}{2}$  lines; that of the positive plate filled the intermediate circular space left unoccupied by the clay cylinder in a glass vessel, having an interior diameter of  $25\frac{1}{2}$  lines. Especial care was taken, as is my custom in the use of this frequently employed arrangement, that the plates, which were retained in their position by the plateholders, always maintained the same distance with respect to the separating plane of the two fluids, which is especially necessary if the fluids differ much in conducting power. In the following indications the zinc plate was always at the distance of  $\frac{1}{8}$  of a line ( $= \frac{3}{16}$  dths of an inch) from the clay cylinder. By this arrangement at least an equality of distances in the different arrangements of both liquids was secured, and that was all I required.

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\* It is—Bichromate of potassa . . . =  $\text{K O } 2 \text{ Cr O}_3 = 1693.55$ .

Chrome alun . . . =  $\text{K O Cr}_2 \text{ O}_3, 4 \text{ S O}_3 + 24 \text{ H}_2 \text{ O}$ .

4 at. of hydrated sulphuric acid =  $4 (\text{S O}_3 \text{ H}_2 \text{ O}) = 2454.64$ ,

and 1893.55 is to 2454.64 nearly as 3 is to 4.

I now subjoin these indications, in somewhat different order from the original experiments, for the convenience of inspection, and I need only add, that the resistances have been stated in inches of a new silver wire of  $\frac{1}{8}$  of a line diameter.

| Time.                                                | Non-<br>essential<br>Resistance. | Strength of the<br>Current. | Essential<br>Resistance. | Electro-<br>motive<br>Power*. |
|------------------------------------------------------|----------------------------------|-----------------------------|--------------------------|-------------------------------|
| I. Sulphuric Acid.—Nitric Acid.                      |                                  |                             |                          |                               |
| a) Zinc, amalga.—Charcoal.                           |                                  |                             |                          |                               |
| 12 <sup>h</sup> 3'                                   | 26·27                            | sin. 40° 17'                | } 6·30                   | 21·06                         |
| 5.                                                   | 36·27                            | 29 39                       |                          |                               |
| b) Zinc, amalga.—Platina.                            |                                  |                             |                          |                               |
| 10 <sup>h</sup> 21'                                  | 36·27                            | sin. 31° 1'                 | } 5·04                   | 21·29                         |
| 24                                                   | 26·27                            | 42 50                       |                          |                               |
| II. Sulphuric Acid.—Chromic Acid.                    |                                  |                             |                          |                               |
| a) Zinc, amalga.—Charcoal.                           |                                  |                             |                          |                               |
| 11 <sup>h</sup> 6'                                   | 26·27                            | sin. 40° 6'                 | } 12·28                  | 21·61                         |
| 38                                                   | 36·27                            | 26 26                       |                          |                               |
| 40                                                   | 26·27                            | 34 6                        |                          |                               |
| b) Zinc, amalga.—Platina.                            |                                  |                             |                          |                               |
| 10 <sup>h</sup> 1'                                   | 26·27                            | sin. 22° 50'                | } 8·30                   | 13·42                         |
| 3                                                    | 36·27                            | 17 31                       |                          |                               |
| c) Zinc, amalga.—Copper.                             |                                  |                             |                          |                               |
| 10 <sup>h</sup> 52'                                  | 36·27                            | sin. 18° 3'                 | } 6·34                   | 13·20                         |
| 54                                                   | 26·27                            | 23 53                       |                          |                               |
| III. Sulphuric Acid.—Solution of Sulphate of Copper. |                                  |                             |                          |                               |
| Zinc, amalga.—Copper.                                |                                  |                             |                          |                               |
| 12 <sup>h</sup> 33'                                  | 26·27                            | sin. 19° 25'                | } 14·72                  | 13·63                         |
| 35                                                   | 36·37                            | 15 30                       |                          |                               |

\* In order to give a precise idea of the numbers given in this table, I must observe that, if the resistances were of a value to be expressed by the same numbers, all the strengths of the different currents must then necessarily be = 1. The strength of this current, which would, therefore, produce in the sinus-indicator a declination of 90°, is, in my apparatus, and the proportion of branch-wires commonly used with it, sufficient to evolve from water in one minute 14·54 cubic centimetres of explosive gas, reduced to 0<sup>m</sup>, 76 and 0°. This indication, which, according to a method not hitherto described, was obtained some time ago partly by means of the decomposition of water, and partly by means of the precipitation of silver, which latter I think more exact, is, indeed, not strictly in accordance with the present state of the apparatus, on account of its having since undergone some little change: it is, nevertheless, very nearly accurate.



As before stated, the action of all such series is not absolutely constant; on the contrary, in the best arrangements, the force of the current increases from the moment of contact, during a more or less protracted time, until it attains a state which may be considered as constant, since it is uniformly maintained for hours without artificial means. Therefore, also, in these experiments, more observations were made than those given, and the indications of constant action were not taken until they seemed to have reached a fixed condition. All the above-mentioned combinations were constant in this sense, with the exception of that of charcoal in chromic acid, the current of which showed a decreasing progress from the commencement, as will be clearly illustrated by the result of the first observation I have adduced for that purpose. The indication made in this combination can, therefore, only be considered as an approximation.

[To be continued.]

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ART. XX.—*Observations on Photographic Processes.*

By WILLIAM F. CHANNING.

IN the photographic preparations of silver, the agency of light is confined to a change in the arrangement of the particles, or to a partial decomposition. As in galvanic decomposition, it is assisted by coinciding chymical affinities, and these may be brought to act on the salt of silver either in the preparation before exposure to light, or afterwards to bring out the impression. In the Daguerreotype, mercury seems to act mechanically in making apparent the molecular change wrought in the iodide of silver by the action of light. In the recent photographic processes of Talbot, however, a chymical agent is used subsequently to complete the decomposition which light had begun.

A sensitive preparation of silver is one in which "the elements are so delicately balanced as to be overturned by the slightest cause\*." The fulminating compounds of silver are examples of such a composition, and may form hereafter preparations very sensitive to light. None of the more simple salts of silver are immediately reduced by light, though it may afterwards be made apparent by chymical means that they have undergone a change of structure, or that a subsalt has been formed. Thus chloride of silver is apparently insensible to light, unless, for example, organic matter, containing carbon, oxygen and hydrogen, be associated with it, when the affinity of the carbon for the oxygen, and of the hydrogen for the chlorine, immediately determines a reduction. Thus carbon reduces the oxide of silver in many of its oxy-salts. Electro-positive bodies, therefore, which are associated with the salt of silver, tend directly or indirectly to

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\* Hunt: Griffin's Scientific Miscellany.

decompose it, by removing the electro-negative principle combined with the silver, while an excess of electro-negative elements, oxygen, chlorine, &c., as in the perchlorate, chlorate, and hypochlorate of silver, retards decomposition. Thus compounds, such as phosphorus, tannic, gallic, crenic, fulminic acids, which may be termed deoxidizing agents, all absorbing oxygen, and also another series acting mechanically, such as mercury, deserve attention, first in making a photographic preparation; and second, in bringing out an impression after the action of light. There are singular reactions, however, constantly observed in photographic chemistry, which cannot be comprehended or explained by any general statement.

In a recent process of Hunt\*, a paper is first prepared with iodide of silver, and then washed with ferrocyanide of potassium and used moist. The ferrocyanide contains carbon, potassium, iron, and nitrogen without oxygen. Mixed in powder with substances abounding in oxygen, such as nitrate or chlorate of potash, it explodes by heat or percussion. In this case, it is easy to see that if water were present a slight cause would determine its oxygen to the ferrocyanide and its hydrogen to the iodine of the silver. Water in the form of water of crystallization, hygrometric moisture, or artificially applied, often thus performs an important part in these preparations. The cyanide of potassium is equally or more efficacious than the ferrocyanide. Besides the inconvenience of using a moist paper, this is not so sensitive as Talbot's calotype paper†, founded on his important discovery of the properties of gallic acid.

For this the paper is washed successively with nitrate of silver and iodide of potassium; then, before using, with a mixture of acetic acid, nitrate of silver, and gallic acid, which must be made at the time. After a short exposure in the camera, the paper, still apparently unchanged, is washed again with the above mixture, when the impression begins to grow upon the paper in a very striking and beautiful manner. The objection to this process is its complication. The following is a very simple modification of it, nearly as sensitive, and more so than the original Daguerreotype plates.

A piece of best glazed letter paper is fastened by means of a penknife point and some hard wood pegs to a piece of smooth pine board. It is washed over once quickly and evenly by means of a camel's hair brush, with a solution of sixty grains crystallized nitrate of silver in one ounce of water. Let it dry spontaneously, and as soon as dry wash it for a minute with a brush and solution of ten grains of iodide of potassium in one ounce of water. Then instantly wash it with water by dipping it three or four times in a suitable vessel, and dry it by pressing it gently

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\* Report of the British Association, 1841.

† London and Ed. Phil. Mag. Aug. 1841.

between blotting paper. It is then ready for the camera. One minute is sufficient for a building on which a February sun is shining; four or five minutes for general views. A rather more sensitive paper is prepared by using a mixed solution of five grains of iodide of potassium and five grains of chloride of sodium in one ounce of water, instead of the iodide of potassium. Five grains of bromide of potassium in one ounce of water form a rather less sensitive preparation. These papers may also be made more sensitive by washing them again, after the iodide of potassium, with nitrate of silver, though it will hardly repay the labour. The series of salts of silver, according to their sensibility, when afterwards brought out by gallic acid, appears to be iodide with chloride, iodide, iodide with bromide, bromide, bromide with chloride, chloride, fluoride, nitrate; ferrocyanide, sulphocyanide, cyanide. The series with mercury differs essentially from this.

After exposure these papers are still white, but they need only to be fastened as before to another piece of board, and washed over once quickly and evenly with a saturated solution of crystallized gallic acid (only three or four grains in one ounce of water), or with solution of galls, to bring out in a few moments the hidden impression. A weak impression may be brought out by several washings, letting the paper dry between each. Too long an exposure, however, in the camera, is better than too short a one. When it has come out sufficiently, dip it in water and fix it by washing it with the iodide or other solution used in the preparation. Then wash it in water, and dry between blotting paper as before.

In views from which copies are to be taken by superposition over other sensitive paper, it is better perhaps to use the bromide throughout, as it leaves the paper whiter and more permeable to the chemical rays, or to fix the paper prepared with iodide, by washing with a bromide solution or hyposulphite of soda. Care must be taken, in making proof, not to use the nitrate of silver or galls too profusely, otherwise the paper will be stained through. Papers merely washed with nitrate of silver, used as soon as dry, and brought out afterwards by galls, may answer well for copies.

These papers should not be exposed to light or heat during any part of the process, and there should be no delay between the use of the nitrate of silver and iodide of potassium; for the nitrate on paper is soon decomposed, so that gallic acid discolours it. The iodized paper will keep a long while, unless there is much excess of nitrate of silver. It is best, however, to use it soon after it is made.

It is important to the sensibility of all these preparations, that the nitrate of silver solution should be neutral, have no excess of acid, the electro-negative ingredient; and also that there should be no excess of iodide of potassium, another electro-

negative element, on the paper, but rather the reverse. The brushes used should be made without metal, and no metal should touch the paper during its preparation. All the parts of the operation should be kept distinct to ensure a perfect result.

The analogy in these processes to the Daguerreotype is very interesting, iodide of silver being brought out in both cases after the action of light. Though the Daguerreotype cannot be brought out by gallic acid, yet Balard noticed a year ago\* that the vapour of mercury would bring out an impression on prepared paper. It is curious to hold one half of a piece of iodized paper, which has received an impression over mercury heated in a capsule, and wash the other half with gallic acid. The first brings out a faint negative sketch, the last a strong negative picture. By preparing a black carbonaceous paper with iodide of silver, the vapour of mercury brings out a sort of positive picture, which may deserve some attention.

The solution of galls seems to furnish much that is wanted in a secondary reducing agent. Still the field is open for inquiry. A solution of common tea, from its tannic acid, brings out an impression imperfectly well. Crenic acid, or a solution of peat, which also abstracts oxygen during its decomposition, seems also to have this property.

There is no science which is now advancing so rapidly as photography. These processes will soon undoubtedly be superseded; they may, however, be of interest and use at the present moment.—*Silliman's Journal*.

Boston, 1842.

ART. XXI.—*Remarks on the detection of Metallic Arsenic for Judicial Proceedings.* By Professor OTTO.

IN order to show the separation of arsenic from the contents of the stomach by different methods, I once directed that a grain of arsenious acid should be added to a mixture of egg and potatoes. This poisonous mass was boiled with a ley of potassa, and, after solution had ensued, acidulated with muriatic acid, as had been recommended, for the purpose of separating, so far as possible, organic matter, previous to the general diffusion of the admirable method of Mr. Marsh. The precipitate, however, produced by sulphuretted hydrogen in the filtered acid solution, did not contain any arsenic. The reason of this was soon discovered. By the action of potassa on the white of egg and similar proteine bodies, sulphuret of potassium, as is well known, was produced; this being decomposed by the acid, the metallic arsenic of the arsenious acid had been disengaged by the sulphuretted hydrogen in the form of sulphuret of arsenic. This method is therefore inapplicable.—*Liebig's Ann.*

\* Comptes Rendus, February, 1841.

| NOMINA.                              | FORMULÆ.                                                      |
|--------------------------------------|---------------------------------------------------------------|
| <i>Acidum</i> Phosphorosum . . . . . | $\ddot{\text{P}}_4^s$ . . . . .                               |
| — Pyrogallicum. . . . .              | ${}_p\bar{\text{G}} = \text{H}^6 \text{C}^6 \text{O}^3$ . .   |
|                                      | ${}_p\bar{\text{G}}^s$ . . . . .                              |
|                                      | ${}_p\bar{\text{G}}^s$ . . . . .                              |
| — Pyromucicum. . . . .               | ${}_p\bar{\text{M}} = \text{H}^4 \text{C}^9 \text{O}^6$ .     |
|                                      | ${}_p\bar{\text{M}}^s$ . . . . .                              |
|                                      | ${}_p\bar{\text{M}}^s$ . . . . .                              |
| — Pyrotartaricum. . . . .            | ${}_p\bar{\text{T}} = \text{H}^6 \text{C}^4 \text{O}^4$ .     |
|                                      | ${}_p\bar{\text{T}}^s$ . . . . .                              |
|                                      | ${}_p\bar{\text{T}}^s$ . . . . .                              |
| — Selenicum. . . . .                 | $\ddot{\text{Se}}$ . . . . .                                  |
|                                      | $\ddot{\text{Se}}^s$ . . . . .                                |
|                                      | $\ddot{\text{Se}}^s$ . . . . .                                |
| — Selenosum. . . . .                 | $\ddot{\text{Se}}$ . . . . .                                  |
|                                      | $\ddot{\text{Se}}^s$ . . . . .                                |
|                                      | $\ddot{\text{Se}}^s$ . . . . .                                |
| — Silicicum. . . . .                 | $\ddot{\text{Si}}$ . . . . .                                  |
|                                      | $\ddot{\text{Si}}^s$ . . . . .                                |
|                                      | $\ddot{\text{Si}}^s$ . . . . .                                |
| — Stearicum. . . . .                 | $\bar{\text{St}} = \text{H}^{134} \text{C}^{70} \text{O}^3$ . |
|                                      | $\bar{\text{St}}^s$ . . . . .                                 |
|                                      | $\bar{\text{St}}^s$ . . . . .                                 |
| — Stibicum. . . . .                  | $\ddot{\text{Sb}}$ . . . . .                                  |
|                                      | $\ddot{\text{Sb}}^s$ . . . . .                                |
|                                      | $\ddot{\text{Sb}}^s$ . . . . .                                |
| — Stibiosum. . . . .                 | $\ddot{\text{Sb}}$ . . . . .                                  |
|                                      | $\ddot{\text{Sb}}^s$ . . . . .                                |

| PONDERA ATOMORUM. |                    | PARTES CENTESIMALES. |           |                      |
|-------------------|--------------------|----------------------|-----------|----------------------|
| O = 100           | H <sub>2</sub> = 1 | + E                  | — E       | H vel H <sub>2</sub> |
| 2076,85           | 166,42             |                      |           |                      |
| 796,06            | 63,79              | C=57,61              | O = 37,69 | H = 4,70             |
| 1592,13           | 127,58             |                      |           |                      |
| 2388,18           | 191,37             |                      |           |                      |
| 1812,90           | 105,20             | C=52,40              | O = 45,70 | H = 1,90             |
| 2625,79           | 210,41             |                      |           |                      |
| 3938,69           | 315,61             |                      |           |                      |
| 743,19            | 59,55              | C=41,14              | O = 53,82 | H = 5,04             |
| 1486,38           | 119,10             |                      |           |                      |
| 2229,57           | 178,16             |                      |           |                      |
| 794,58            | 63,67              | 62,24                | 37,76     |                      |
| 1589,17           | 127,34             |                      |           |                      |
| 2383,75           | 191,01             |                      |           |                      |
| 694,58            | 55,66              | 71,21                | 28,79     |                      |
| 1389,16           | 111,31             |                      |           |                      |
| 2083,75           | 166,97             |                      |           |                      |
| 577,31            | 46,26              | 48,04                | 51,96     |                      |
| 1154,62           | 92,52              |                      |           |                      |
| 1731,94           | 138,78             |                      |           |                      |
| 6686,76           | 535,81             | C=80,02              | O = 7,48  | H = 12,50            |
| 13373,52          | 1071,63            |                      |           |                      |
| 20060,29          | 1607,44            |                      |           |                      |
| 2112,90           | 169,31             | 76,34                | 23,66     |                      |
| 4225,81           | 338,62             |                      |           |                      |
| 6338,71           | 507,93             |                      |           |                      |
| 2012,90           | 161,30             | 80,13                | 19,87     |                      |
| 4025,81           | 322,59             |                      |           |                      |

| NOMINA.                          | FORMULÆ.                                                |
|----------------------------------|---------------------------------------------------------|
| <i>Acidum</i> Stibiosum. . . . . | $\text{Sb}_2^3$ . . . . .                               |
| — Succinicum. . . . .            | $\bar{\text{S}} = \text{H}^4 \text{C}^4 \text{O}^2$ . . |
|                                  | $\bar{\text{S}}^4$ . . . . .                            |
|                                  | $\bar{\text{S}}^3$ . . . . .                            |
| — Sulphuricum. . . . .           | $\bar{\text{S}}$ . . . . .                              |
|                                  | $\bar{\text{S}}^4$ . . . . .                            |
|                                  | $\bar{\text{S}}^3$ . . . . .                            |
| — Sulphurosum. . . . .           | $\bar{\text{S}}$ . . . . .                              |
|                                  | $\bar{\text{S}}^4$ . . . . .                            |
|                                  | $\bar{\text{S}}^3$ . . . . .                            |
| — Tantalicum. . . . .            | $\bar{\text{T}}\text{a}_2$ . . . . .                    |
|                                  | $\bar{\text{T}}\text{a}_2^2$ . . . . .                  |
|                                  | $\bar{\text{T}}\text{a}_2^3$ . . . . .                  |
| — Tartaricum. . . . .            | $\bar{\text{T}} = \text{H}^4 \text{C}^4 \text{O}^2$ . . |
|                                  | $\bar{\text{T}}^4$ . . . . .                            |
|                                  | $\bar{\text{T}}^3$ . . . . .                            |
| — Telluricum. . . . .            | $\bar{\text{Te}}$ . . . . .                             |
|                                  | $\bar{\text{Te}}^4$ . . . . .                           |
|                                  | $\bar{\text{Te}}^3$ . . . . .                           |
| — Tellurosum. . . . .            | $\bar{\text{Te}}$ . . . . .                             |
|                                  | $\bar{\text{Te}}^4$ . . . . .                           |
|                                  | $\bar{\text{Te}}^3$ . . . . .                           |
| — Titanicum, . . . . .           | $\bar{\text{Ti}}$ . . . . .                             |
|                                  | $\bar{\text{Ti}}^4$ . . . . .                           |
|                                  | $\bar{\text{Ti}}^3$ . . . . .                           |
| — Uranicum. . . . .              | $\bar{\text{U}}$ . . . . .                              |
|                                  | $\bar{\text{U}}^4$ . . . . .                            |

| PONDERA ATOMORUM. |                    | PARTES CENTESIMALES. |           |                      |
|-------------------|--------------------|----------------------|-----------|----------------------|
| O = 100           | H <sub>2</sub> = 1 | + E                  | — E       | H vel H <sub>2</sub> |
| 6038,71           | 483,89             |                      |           |                      |
| 630,71            | 50,54              | C=48,48              | O=47,56   | H=3,96               |
| 1261,42           | 101,08             |                      |           |                      |
| 1892,13           | 151,62             |                      |           |                      |
| 501,16            | 40,16              | 40,14                | 59,86     |                      |
| 1002,33           | 80,32              |                      |           |                      |
| 1503,49           | 120,48             |                      |           |                      |
| 401,16            | 32,15              | 50,15                | 49,85     |                      |
| 802,33            | 64,29              |                      |           |                      |
| 1203,49           | 96,44              |                      |           |                      |
| 2607,43           | 208,94             | 88,49                | 11,51     |                      |
| 5214,86           | 417,87             |                      |           |                      |
| 7822,29           | 626,81             |                      |           |                      |
| 830,71            | 66,56              | C = 36,81            | O = 60,19 | H=3,00               |
| 1661,42           | 133,13             |                      |           |                      |
| 2492,13           | 199,70             |                      |           |                      |
| 1101,76           | 88,29              | 72,77                | 27,23     |                      |
| 2203,53           | 176,57             |                      |           |                      |
| 3305,29           | 264,86             |                      |           |                      |
| 1001,76           | 80,27              | 80,04                | 19,96     |                      |
| 2003,53           | 160,54             |                      |           |                      |
| 3005,29           | 240,82             |                      |           |                      |
| 503,66            | 40,36              | 60,29                | 39,71     |                      |
| 1007,32           | 80,72              |                      |           |                      |
| 1510,98           | 121,08             |                      |           |                      |
| 5722,72           | 458,57             | 94,76                | 5,24      |                      |
| 11445,43          | 917,13             |                      |           |                      |



ART. XXIII.—*Sodæ Potassio-tartras*.—*Economical Process for Manufacturers.*

M. MOHR has furnished the following very economical method of manufacturing this important salt:—He saturates the bitartrate of potassa with carbonate of potassa, and adds rough nitrate soda in the requisite proportions (according to its refraction, technically termed), 19 parts of bitartrate of potassa requiring usually about  $8\frac{1}{2}$  parts of nitrate soda. It is then allowed to stand, in order to deposit the sediment, filtered and crystallized. The crystals of saltpetre are separated mechanically, and the Rochelle salt purified by recrystallization.—*B. R.* xxii. pp. 135, 136.

## NOTICES TO CORRESPONDENTS.

MILK OF ROSES.—A SUBSCRIBER, Dublin.

|                                                                              |                         |
|------------------------------------------------------------------------------|-------------------------|
| Take of Bitter Almonds                                                       | 6 drachms.              |
| Jordan Almonds                                                               | 12 drachms.             |
| Blanch in cold water, dry in a clean linen cloth, and beat into a paste with |                         |
| Castile Soap                                                                 | 1 drachm.               |
| And add thereto, thoroughly incorporating, so as to form a uniform paste,    |                         |
| Spermaceti                                                                   | 15 grains. } Previously |
| White Wax                                                                    | 30 grains. } melted     |
| Oil of Almonds                                                               | 1 dram. } together.     |
| To this paste must be gradually added, continually stirring,—                |                         |
| Distilled Water                                                              | 14 ounces.              |
| Rectified Spirits of Wine                                                    | 6 ounces.               |
| Otto Roses                                                                   | 6 drops.                |

Thus prepared, Milk of Roses may be kept unchanged for six months—far preferable for the purposes for which it is required to the mixture of oil of almonds, carbonate of potash, &c.

MR. D. is thanked for his offer. The journal shall be forwarded.

"A MEMBER."—To his inquiry: certainly not. We utterly eschew polemics.

"AMICUS."—Minims. Had we intended drops, the word guttæ would have been used.

J. E., Bristol.—Argenti nitras is usually contaminated with potassæ nitras [the London makers use two ounces in 100] to produce the preparation termed Argenti Nitras Alba. It is thereby unfitted for making "marking-ink without a preparation." Pure silver from the refiners, nitric acid, and ammonia, or ammonio-nitrate of silver, also a minute portion of isinglass with the gum, and Indian ink as a colouring medium, are the ingredients. The solution must be as concentrated as possible. The most elegant formula would be to make a saturated solution of crystallized ammonio-muriate of silver, adding the other ingredients thereto. Some precautions are requisite in making this salt. We will describe its preparation in our next.

CREASOTON.—We intend giving the original papers of Reichenbach. Meanwhile the modified formula of Simon will appear in our next.

J. H.—In the explanation of the Alphabetical Table of Symbols, page 59, line 33, the figure 2 has slipped below the line. A reference to the previous formula will show this typographical error.

THE communication from Medicus in our next, with the quantity of the drug annually imported.

\*.\* Communications, Books for Review, &c. are requested to be addressed—*"To the Editors of the ANNALS OF CHEMISTRY, care of Messrs. Longman, Brown, and Co. Paternoster Row."*

WILSON AND OGILVY, 57, SKINNER STREET, SNOWHILL, LONDON.

THE  
ANNALS OF CHYMISTRY  
AND  
PRACTICAL PHARMACY.

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No. 6.]      FRIDAY, NOVEMBER 4, 1842.      [VOL. I.

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PAINTING IN FRESCO.

It may at first appear strange that the chymist should have any thing to do with the Report of the Commissioners on the Fine Arts; but we may apply to our art what CELSUS says of medicine, *nusquam quidem non est*; it is ubiquitous; and whether the problem be to explain the organic changes going on in the world before us, whether it be desired to give ease to suffering, or furnish new enjoyments to luxury, chymistry is ever ready to lend her helping hand. It has been proposed to decorate the new Houses of Parliament with paintings in fresco—a branch of art hitherto but little cultivated in this country. Fresco, as most of our readers are aware, is “a painting on fresh plaster, or on a wall laid with mortar not yet dry”;\* and the composition of this plaster is, consequently, a point of the highest interest to the artist.

Those who are most gratified by the lower departments of art, who are delighted by a cat or a fiddle painted, as Sir JOSHUA REYNOLDS says, “as if you could take it up,” may regard the present opportunity with indifference; but those whose nobler thirst is for the ideal, will hail the present occasion as one “which, taken at the flood, leads on to fortune.” They will consider even the smoothing down of mechanical difficulties as no trifle when effected in such a cause; like the armourer who, when equipping a hero, seems to partake of his future glory. It does not appear probable that the artists themselves will investigate this subject with much success; their pursuits lie in a different direction, and chymical works will not

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\* Todd, in his edition of Johnson's Dictionary.

minute accuracy, in so far as it is most advantageously employed for fresco-painting, a definite answer might at once be given to the question proposed. But this, so far as I am aware, has not been tested with those advantages which modern science presents." (Report, p. 45.)

Then let it be tested, as soon as possible, say we.

It is clear that the question of the fittest condition of lime for fresco-painting is just where it was before the inquiry of the Commissioners.

The action of lime on colours has not been cleared up, nor has the setting of the lime been explained. As regards the question of sulphuric and sulphurous acids (we would add also ammonia, inconsistent as it may appear,) suggested by a correspondent of the *Times*, Oct. 31, their anticipated effects also deserve a no less searching investigation. Let us hope that, before it is too late, these points may be sedulously examined by scientific chymists.

We earnestly invite the hints and observations of our readers on this subject; feeling, as we do, that the matured experience of its correspondents is the very life-blood of a practical journal.

## CHYMISTRY, OPERATIVE AND EXPERIMENTAL.

### ART. II.—*New Discovery of Selenium.* By Professor OTTO.

THE large quantities of sulphurous acid which were formerly lost during the process of roasting the ores of the Rammelsberg Ocre Works (one of the richest parts of the Harz mountain in the north of Germany), have for some time been employed for the manufacture of sulphuric acid. From the lead-chamber at Oker, in the course of last year, about 300 cwt. of sulphuric acid has been produced. In the first compartment of the lead-chamber a very delicate reddish slimy matter is found, consisting partly of the volatilized components of the ores mechanically carried over, and partly of products created by the action of the sulphuric acid thereon. By the kindness of Mr. Sandorfy, at Harzburg, I received a sample of this slimy matter, with this remark,—“that the smell which it evolved under the blow-pipe indicated traces of selenium.” On analysis this remark was confirmed. From 500 grammes I obtained about 20 grammes (or 4 per cent.) of selenium; wherefore this slimy compound may be considered as a new and interesting source of this rare element, which Berzelius, as is well known, discovered in like manner in the slimy products of a sulphuric acid factory at Gripsheim. I

intend giving a more copious report on this slimy mass after examination of a larger quantity which I have now obtained through the kindness of the ducal direction of the ore works. For the present I beg to furnish merely the following communication. I have at present detected in it, besides selenium and sulphur, a somewhat considerable quantity of quicksilver and antimony, a little zinc, much copper and iron, and more lead; the latter existing chiefly as a sulphate, since water takes up a considerable quantity of the sulphates of protoxide of iron and oxide of copper. The sulphuric acid with which the slimy matter is mixed contains arsenic. When previously digested in water, dried, and afterwards digested with aqua regia and sulphuric acid, the excess of acids being removed by evaporation, and the residue treated with water, a solution is obtained, from which sulphate of ammonia decomposes a white or flesh-coloured precipitate. This precipitate contains all the quicksilver of the mass, besides chlorine, and a considerable quantity of selenium\*. After filtering this precipitate, and adding sulphate of ammonia, no selenium is precipitated—not even if it be strongly acidulated with muriatic acid. The dark-red precipitate of selenium instantly appears, however, if concentrated sulphuric acid be added. Concentrated sulphuric acid, in combination with sulphate of ammonia, is the most sensible re-agent for selenium, and the best means of separating it.

If the filter, with its voluminous red precipitate of selenium, is enveloped, in the moist state, in bibulous paper, and placed in a drying-stove, in a short time aqueous vapours will be evolved whilst the paper is still moist, and, when dry, instead of a red hydrated precipitate, several masses of selenium, reduced to a very small volume, having a perfect metalline appearance, and not containing any water, will be obtained. This proves that hydrated selenium suddenly gets rid of its water at a certain temperature, although completely surrounded by moisture, and its exsiccation, therefore, by evaporation, cannot be effected. If the filtration of selenium is performed whilst hot, the well-known hydrated light-red precipitate is not obtained, but a dark heavy precipitate.

During the numerous experiments which I undertook whilst examining the slimy matter in question with selenium and its combinations, my early opinion, that selenium should be placed in the series of non-metallic bodies by the side of sulphur, has been somewhat weakened. I endeavoured to precipitate this metal (quicksilver) by means of copper from the solution of selenious acid containing quicksilver, but found that the selenium was separated by the copper in preference to the quicksilver.—*Liebig's Annalen*.

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\* This interesting precipitate may easily be obtained in a direct way by adding a solution of selenious acid to a solution of sublimate of quicksilver heated with sulphate of ammonia.

**ART. III.—Action of Cyanide of Potassium on Metallic Oxides and Metallic Sulphurets in the Moist Way.** By M. HAIDLEN and M. R. FRESSENIUS.

[Continued from page 137.]

14. *Copper*.—If cyanide of potassium be added to the solution of a salt of oxide of copper, a yellowish-green precipitate of cyanide of copper is obtained, which easily dissolves in an excess of the precipitant. Acids cause a white precipitate of cyanide of copper in the yellowish solution, which redissolves in an excess of acid. Sulphuret of copper is easily taken up by cyanide of potassium. The yellow solution contains sulphuret of potassium, and cuprocyanide of potassium. After a short time it entirely loses its colour, without becoming turbid. If sulphuric or muriatic acid is added to excess, the double combination of cyanide is decomposed, as well as the sulphuret of potassium. All the copper is again precipitated as sulphuret of copper, disengaging at the same time prussic acid.

15. *Mercury*.—By adding cyanide of potassium to the salts of protoxide of mercury, a grey precipitate of metallic mercury is obtained, and cyanide of mercury forms in the solution. Oxide of mercury, on account of the great affinity of cyanogen for mercury, invariably forms cyanide of mercury, whether introduced into hydrocyanic acid or into a solution of cyanide of potassium. If cyanide of potassium be present in excess it combines with the latter, forming a double salt. Cyanide of mercury is not decomposed by boiling with the dilute oxiacids. Both the sulphur combinations of mercury are insoluble in cyanide of potassium. If sulphuretted hydrogen is introduced into a solution of cyanide of mercury dissolved in cyanide of potassium, all the quicksilver is precipitated as sulphuret.

16. *Silver*.—By mixing any salt of silver with cyanide of potassium, a white caseous precipitate of cyanide of silver is produced, which easily dissolves in an excess of the precipitant. If nitric acid be added to the solution, the cyanide of silver is completely precipitated. It is insoluble even if the acid be present in excess. Chloride of silver easily dissolves in cyanide of potassium; sulphuret of silver is insoluble therein.

17. *Gold*.—By adding cyanide of potassium to chloride of gold, a yellow crystalline precipitate of bichyanide of gold is obtained, which dissolves in an excess of the precipitant. Muriatic acid restores the precipitate by decomposing the cyanide of potassium: it may be redissolved by the addition of the former in excess.

18. *Platina*.—By mixing chloride of platina with cyanide of potassium, adding the precipitant in excess, and heating the solution, a crystalline yellow precipitate of platina, easily dis-

solved, is obtained. Acids restore the precipitate by decomposing the cyanide of potassium: by muriatic and nitric acids it is dissolved. Ammonia precipitates platino-muriate of ammonia from the muriatic acid solution.

19. *Tin*.—The bichloride and chloride of tin, when mixed with cyanide of potassium, yield precipitates of protoxide and peroxide of tin. The liquid always contains some tin in solution, as may be easily proved by the addition of sulphuretted hydrogen after the filtered liquid has been boiled with muriatic acid in excess. If bisulphuret of tin is treated, boiling, with a considerable excess of cyanide of potassium, some small portion is dissolved; by adding an acid to the filtered liquid, the dissolved portion separates as a protosulphuret. If protosulphuret of tin is heated with cyanide of potassium, the tin is obtained, partly in solution, and partly separated as hydrated oxide.

20. *Antimony*.—Bichloride of antimony behaves towards cyanide of potassium in the same manner as bichloride of tin. Bisulphuret of antimony gradually dissolves by continued boiling with cyanide of potassium. Protosulphuret of antimony is easily taken up by a solution of cyanide of potassium: acids precipitate it from the solution without any change.

21. *Chromium*.—By mixing solutions of chromic acid with cyanide of potassium, a green precipitate is obtained, which, digested or heated with a good deal of cyanide of potassium, redissolves, forming a yellow liquid, in which acids do not produce any precipitate. It contains, as already shown by Boeckmann, chromocyanide of potassium.

We examined, lastly, the behaviour of some metallic acids towards cyanide of potassium, the arsenious and tellurous acids, also titanous, wolframic, and molybdic acids. The reactions were, as presupposed, perfectly similar to those which are produced by pure potassium.

If we now arrange the above examined metals according to their behaviour towards cyanide of potassium, the following two principal divisions are applicable:—

*A. Metals which, when their salts are submitted to the action of cyanide of potassium, do not enter into combination with cyanogen.* These may be subdivided into—

*a.* Those which are not precipitated by cyanide of potassium; viz. potassa, soda, and ammonia.

*b.* Those which are only partly precipitated by cyanide of potassium; viz. antimony and tin.

*c.* Those which are completely disengaged from their solutions by cyanide of potassium; viz. lime, barytes, strontian, magnesia, alumina, lead, and bismuth.

**B. Metals whose solutions, submitted to the action of cyanide of potassium, are converted into metallic cyanides.** These may be classed in three groups—

*a.* Those whose cyanides are insoluble in water, but, when aided by cyanide of potassium, binary combinations of the second class ( $M\text{ Cy} + K\text{ Cy}$ ), soluble in water, are produced. Acids disengage the metallic cyanides from their solutions by decomposing the cyanide of potassium. They are either insoluble in nitric acid, as cyanide of silver, or soluble, like cyanide of nickel, or easily soluble, like bichyanide of copper, cyanide of zinc, cyanide of cadmium, bichyanide of palladium, cyanide of platina.

*b.* Those, the metallic cyanides of which are insoluble in water, but are dissolved by an excess of cyanide of potassium in solution. Combinations are found in which all the cyanogen must be supposed to be in combination with the metal, forming a compound radical, and united to potassium, yielding a binary combination of the first class (for instance,  $Fe\text{ Cy } 3 + 2\text{ K}$ ). Acids do not disengage metallic cyanides from these combinations. They are iron, cobalt, manganese, chromium, uranium.

*c.* Mercury, the metallic cyanide of which is insoluble in water.

By glancing at the above arrangement it will be at once perceived how manifold are the applications of cyanide of potassium for the purposes of analysis, and how appropriate a reagent it is to separate whole series of bodies from each other, and how manifold are the means which it furnishes (by varying the method of application) for subdividing these series into the individual bodies of which they are composed. The pages of a popular scientific journal are not exactly fitted for containing every individual case in which the application of cyanide of potassium may be adapted to quantitative and qualitative analysis: we, therefore, intend, in our ensuing numbers, to describe only those cases in which it seems to deserve a preference over the reagents hitherto used.

#### APPLICATION OF CYANIDE OF POTASSIUM TO QUANTITATIVE ANALYSIS.

1. Cyanide of potassium is preferable to all other reagents in detecting nickel when cobalt is present. To the acidulated solution of the metals cyanide of potassium is added, until the precipitate produced is redissolved in an excess of the precipitant; diluted sulphuric acid is then added, heated, and the mixture allowed to stand. Should a precipitate be produced, either immediately or after some time (it is immaterial whether

it is cyanide of nickel or cobalto-cyanide of nickel), it indicates the presence of nickel in a very sensible and evident manner.

2. In order to separate the four metals, which, in the ordinary course of analysis, are obtained together, dissolved in nitric acid, viz. lead, bismuth, copper, and cadmium, cyanide of potassium will be found a very excellent means. Cyanide of potassium is added in excess to the solution, when the lead and bismuth will become perfectly disengaged, and may be easily separated by sulphuric acid afterwards: the copper and cadmium remain in the solution. Sulphuretted hydrogen is added to the solution in excess, then heated, and more cyanide of potassium added: a yellow precipitate proves the presence of cadmium. If after the addition of muriatic acid to the filtered liquid a black precipitate appears, copper is present.

[To be continued.]

#### ART. IV.—*New Method of Preparing pure Protoxide of Copper by the Moist Way.*

A SATURATED solution of sugar of milk, containing some carbonate of soda, is poured over recently prepared moist hydrated oxide of copper, and heated to boiling. A dark orange-coloured precipitate of hydrate of protoxide of copper soon appears, from which saccharine matter is removed by washing in distilled water, and then dried.

Magnificently red anhydrous protoxide of copper is obtained in the following way:—A solution of 27 parts of cane sugar, in 60 parts of water, are poured over 9 parts of hydrate of oxide of copper (weighed in the compressed and still moist state); a solution of 18 parts of caustic potassa, in 60 parts of water, added; the whole mass well agitated together at the ordinary temperatures, and strained through linen. If the dark-blue liquid, after being passed through the strainer, is heated, continually stirring over the water-bath, anhydrous protoxide of copper is disengaged, and the liquid becomes colourless.—*Boettger's Beitrage.*

#### ART. V.—*On Chromate of Copper, and the Preparation of Ammonio-Chromate of Copper in a solid form.*

THE different statements regarding the colour of chromate of copper, sometimes called light green, at others yellowish brown, and again white, gave rise to a closer examination of it; and it was found that, by precipitating a salt of oxide of copper with neutral chromate of potassa, a dark-red or yellow-brown precipitate is produced, which, after being thoroughly washed with hot water, becomes a little lighter, and, when dry, has exactly the appearance of pulverized mineral hydrated oxide of iron. The salt is obtained of precisely the same colour by the direct action of chromic acid on carbonate of peroxide copper. Caustic potassa or caustic soda precipitates from the cold solution hy-



drated oxide of copper; when heated, anhydrous oxide of copper. Caustic ammonia dissolves the salt, forming a magnificent dark-green liquid, from which, by the admixture of spirit of wine, ammonio-chromate of copper, or cupri-chromate of ammonia, is disengaged in the form of a powder of a splendid rather dark green appearance.

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ART. VI.—*Argento-Chloride of Ammonia, or Ammonio-Chloride of Silver.*

DISSOLVE silver in nitric acid, using an excess of acid, precipitate with common salt, and wash the precipitate with warm distilled water. Expose the still moist precipitate to an atmosphere of ammoniacal gas, as by setting a small cup of solution of ammonia in an evaporating bason containing the precipitated chloride, and covering both vessels with a plate or sheet of paper. After it has been thus exposed for a few hours, digest the precipitate, in a Florence flask closed with *bladder* perforated by a pin-hole, with liquor ammoniæ fortissim. sp. gr. '880, assisting the solution by the very gradually applied heat of a water bath. When the water in the bath has been brought to the boiling point, remove the flask, and set aside to cool; crystals will form, and at the same time, provided the chloride had been in the slightest degree discoloured by exposure to light, *a brown pulverulent precipitate*, of which take care: it is *a fulminating compound of the most dangerous description*. This precaution is the more necessary, since on one occasion, when endeavouring to investigate the cause of this decomposition, an explosion took place which instantly converted the laboratory furnace beside which it had been placed, into a heap of rubbish. The crystals are removed from the liquor, washed in very cold weak solution of ammonia, and dried by folds of blotting paper.

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ART. VII.—*Supposed Existence of Nitrogen in Sugar; being an abridgement of M. Reiset's paper on the process of MM. Varrentrapp and Will for determining the quantity of azote in organic bodies.*

IN our last number Mr. Dell narrates an experiment whereby he has been led at a first glance to suppose that sugar contains nitrogen. Perhaps the following abridged extract from the *Annales de Chimie*, tom. v. Aout, 1842, will afford him the explanation he seeks, shewing that the ammonia arises from the nitrogen of the atmosphere.

M. Reiset had been led to investigate the value of the method proposed by MM. Varrentrapp and Will, to determine the quantity of nitrogen in organic bodies, and which ingenious method consists in igniting the presumed azotised matter with a mix-

ture of hydrate of soda and lime, whereby it loses the whole of its nitrogen in the form of ammoniacal gas, which is received in hydrochloric acid, then converted into ammonio-muriate of platina; and from the weight of this salt, or of the metallic platina left after ignition, that of the azote is deduced.

Now, in order to assure us that this method of proceeding is unexceptionable, it is necessary to prove that the whole of the nitrogen contained in the matter submitted to analysis is converted into ammonia, and to demonstrate, by direct experiment, that the atmospheric azote present in the tube of combustion can in no case whatever furnish ammonia. The experiments of Berzelius\*, and those more recently undertaken by MM. Varrentrapp and Will, have demonstrated that the first of these conditions is perfectly fulfilled. All azotised substances, with the exception of those containing their azote in the state of nitric acid, transform the whole of their azote into ammonia, under the influence of the alkaline mixture, at an elevated temperature. The combinations of cyanogen, even, furnish ammonia as readily as a mixture of hydrochlorate of ammonia and lime. But as to the possible formation of a certain quantity of ammonia at the expense of the nitrogen of the atmospheric air contained in the tube of combustion, MM. V. and W. have made the following experiment to annul this objection:—They caused a mixture of hydrogen and azote (such as arises from the decomposition of ammonia by copper), at a red heat, to pass, 1st, over a mixture of calcined cream of tartar and lime; 2d, over a mixture of recently burnt soot and calcareous soda; 3d and last, over a simple mixture of lime and soda; and in none of these cases were they able to detect the smallest quantity of ammonia formed.

According to these authors, this single experiment is conclusive against the supposition that a cause of error may exist in the exact determination of the quantity of azote indicated by their process. If an excess of azote be found to exist, say they, you must seek the cause in the impurity of the materials, or in the chloride of platina. These conclusions do not appear to be sufficiently well based; for although a mixture of azote and hydrogen may not have produced ammonia under the circumstances detailed by MM. Varrentrapp and Will, are we therefrom fully assured that a non-azotised substance, rich in carbon, when burnt with the alkaline mixture, will never yield ammonia in contact with the atmosphere? This was a question the more necessary to be put, for, observes M. Reiset, "Mr. Faraday† had already announced that non-azotised bodies, *sugar*, acetate of potassa, oxalate of lime, tartrate of lead, &c. calcined with soda, potassa, and hydrate of barytes, had invariably yielded him very sen-

\* Annales de Chimie, tom. xxiii. p. 231.

† Annales de Physique, tom. xxviii. p. 435.

sible quantities of ammonia." "The memoir of this sensible chymist," continues M. Reiset, "is well worthy of perusal, as affording a conviction of the irreproachable purity of the tests employed and prepared by Mr. Faraday with the most extreme attention to every minutia. M. Reiset then proceeded to examine if the results obtained by the English chymist could affect the process in question, and he decides the point, after a very careful examination, in the affirmative. And even after passing for three quarters of an hour a rapid current of hydrogen, washed first in sulphuric acid, and then in a concentrated solution of bichloride of mercury, though the tube, containing a mixture of 1 gramme=15·43 grs. of sugar, with the calcareous soda, the sulphuric acid poured on the zinc having been boiled with sulphate of protoxide of iron, in order to purge it from the peroxide of azote it might contain. When the experiment was concluded, there remained on the filter a small quantity of platino-chloride of ammonia in crystals, leaving after calcination 0 gr. 03375 of metallic platina, corresponding to 0 gr. 0048 of nitrogen.

To be quite positive as to this result, the hydrogen was passed over the mixture previous to combustion for six hours, and then an amount corresponding to 0 gr. 0048 of azote, or exactly the same quantity, was the result; whence it may be concluded that a current of hydrogen will *not* remove from a mixture the quantity of azote, which condenses, so to speak, in the pores thereof, and therefore the method of MM. Varrentrapp and Will is liable in some cases to give erroneous results. M. Reiset also found that the combustion of stearine yields nitrogen in like manner.

## CHYMISTRY APPLIED TO MANUFACTURES.

### ART. VIII.—*On the Components and Preparation of Noiseless Congreves.*

ACCORDING to the observations of Dr. R. Boettger\* all congreves which ignite with a crackling report contain chlorate of potassa. The colouring matters are smalts, peroxide of lead, or peroxide of manganese. Of the materials for smouldering (touch) paper some are imbued with saltpetre, others with bichromate of potassa, and again some with acetate of lead. Those containing saltpetre are to be preferred, since they furnish a more permanent glowing red light when ignited.

The best proportion for the mixture of the igniting mass, and which burns with the least noise, is the following:—Sixteen parts of gum Arabic, nine parts of phosphorus, fourteen parts of saltpetre, and sixteen parts of vermilion. Instead of gum

\* In his work, *Beitrag zur Physik und Chemie*, 11th number.

Arabic, mucilage of Tragacanth might be employed\*. In order to prevent the injurious influence of the oxygen of the atmosphere on the mass, it is advisable to cover the points of the matches, after being dipped and dried, with a dilute varnish of copal, or with a solution of gum containing saltpetre.—*Boettger's Beiträge*.

ART. IX.—*On the best Method of reducing Phosphorus in a State of fine Division.*

M. BOETTGER had formerly narrated a process for reducing phosphorus into a state of fine division by agitating it with fresh urine. He has now discovered that urea is the effective principle in urine which causes such division. He has since ascertained that the best method is to employ a solution of pure urea, the preparation of which has now become very easy in consequence of the announcement by Liebig of a formula for preparing artificial urea.—*Boettger's Beiträge*.

ART. X.—*Cyanate of Ammonia (Urea).* By Prof. LIEBIG;

Mix together twenty-eight parts of perfectly dry ferro-cyanate of potassa with fourteen of black oxide of manganese (pure), both in fine powder. Place the mixture on a smooth iron plate, and expose it to a dull-red heat over a charcoal-fire. After a short time it will begin to burn of itself, when it must be frequently stirred. After it cools, it is to be lixiviated with cold water. The solution is to be treated with twenty parts and a half of dry sulphate of ammonia, whereupon a copious deposit of sulphate of potassa will ensue. It has then to be allowed to stand in a warm place (under 212° F.), so as to concentrate the supernatant liquor, which is afterwards to be decanted off, and treated with alcohol of from eighty to ninety per cent. By this process four ounces of perfectly colourless and beautifully crystallized cyanate of ammonia (urea) may be procured from one pound of ferro-cyanate of potassa.—*From Liebig's Ann. in Pharm. Trans.*

ART. XI.—*Method of obtaining Copper and Silver in the most minute State of Division.*

A SOLUTION of sulphate of copper is heated to the boiling-point, and precipitated with distilled zinc. The precipitated copper is then separated from the adherent zinc by diluted sulphuric acid, and dried by exposure to a moderate temperature. From recently precipitated chloride of silver an exceedingly fine silver-dust may also be obtained by boiling it with water acidulated with sulphuric acid and zinc.—*Boettger's Beiträge*.

\* Dr. Buchner remarks: "This would indeed prove a considerable saving, as one part of tragacanth with one hundred parts of water form an equally thick glutinous mass as would one part of gum with four parts of water. But I know, from my own experience, that the mucilage prepared from tragacanth is not fit for the purpose, from having so little consistency."

## CHYMISTRY APPLIED TO AGRICULTURE.

ART. XII.—*Some Remarks on the preceding Experiments of De Saussure, on the Nourishment of Plants.* By J. LIEBIG.

DE SAUSSURE cultivated a horse bean in a decoction of mould with bicarbonate of potassia, containing in 70 milligrammes (= one grain) of dissolved substances, 18 milligrammes (= nearly three-tenths of a grain) of humus, and 52 milligrammes (= four-fifths of a grain) of carbonate of potassa, with other soluble matters extracted from the mould.

The plant was removed after a fortnight from the rest of the liquid, which was evaporated to dryness, when a residue of 20 milligrammes (= three-tenths of a grain) remained, containing nine milligrammes (= one-tenth of a grain) of humus.

The plant, therefore, had absorbed in a fortnight nine milligrammes (= one-tenth of a grain) of humus.

The solution of humus contained, at the beginning of the experiment, 70 parts of humic carbonate of potassa, composed of 52 carbonate of potassa and 18 humus.

After the growth of the plant, there remained in this liquid 20 parts of humic carbonate of potassa, consisting of 9 parts of humus, and 11 parts of carbonate of potassa; consequently, it had absorbed 9 parts of humus, together with 41 of carbonate of potassa.

It evidently appears, then, that the plant had not taken up a corresponding quantity of humus for each part of carbonate of potassa. The plant ought to have absorbed 14 parts of humus with 41 of carbonate of potassa; with 11 of carbonate of potassa, only 4 parts of humus should have remained. It is, therefore, evident, that a separation of the potassa from the dissolved brown substance took place, which must have been produced by the roots of the plant; they had taken up the salt of potassa, and left the humus in the remaining liquid. De Saussure placed beside the vessel in which the plant vegetated a similar vessel, containing a solution of humic carbonate of potassa, in order to observe the changes which the dissolved humus underwent, independent of the action of the plant, merely by the influence of air and evaporation.

The quantity of humus which was left in the fluid of this second vessel after a fortnight has not been stated.

Since, according to the experiments of De Saussure himself, moist humus, or an alkaline solution of humus, absorbs oxygen from the air, and carbonic acid is formed in consequence of this assumption of oxygen, it remains perfectly undecided under what form the nine milligrammes of humus which disappeared had been taken up the plant.

In the first experiment, the liquid was visibly less coloured;

in the second, the residue was stronger coloured than was the original liquid.

In the second experiment the fluid contained  $\frac{1}{800}$  of humic carbonate of potassa, (480 cubic centimetres of water, containing 0.73 grammes of humic carbonate of potassa,) and, notwithstanding this excessive dilution, the colouring substance did not pass over in equivalent proportion with the potassa into the plant, but was left behind. The original quantity of humus was not given, and the absorbed quantity only ascertained from the weight of the residue. This weight, however, changes according to the quantity of potassa, or the quantity of salts, taken up.

In the third experiment, De Saussure cultivated two specimens of *Polygonum persicaria* in a solution of extract of mould. A vessel, containing a solution of the same extract of mould, but without a plant, was placed beside the same.

After nine days the length of the plant had increased by seven centimetres, and sent forth long roots.

The liquid not containing a plant, furnished, after evaporation, 39 milligrammes = 0.6006 gr. of residue. The fluid, in which the plant was grown, left behind a residue of 33 *milligrammes* = 0.5082 gr.

This is the only experiment in which, by comparing the weight, an attempt was made to ascertain the change which the test-liquid undergoes when no plant is grown in it.

This aqueous extract of mould contained, however, according to the examination of De Saussure, nitrate of potassa and soda, as well as chloride of potassium and chloride of calcium; substances which are very easily absorbed by the roots of plants.

It is evident that these soluble salts passed into the plant in a manner precisely similar to the absorption of the carbonate of potassa described in the previous experiment; and the diminution of weight which the soluble component parts of the fluid (in which the plant vegetated) sustained, finds, in this circumstance, a perfectly satisfactory explanation.

In the test-fluid a change was produced, as De Saussure states, by action of the air. It became turbid, whilst the fluid in which the plants vegetated remained clear. It was necessary, as a matter of course, that the latter should undergo a similar change, since the air was not excluded from the vessel; but, in consequence of the presence of the plant, this occurred in another way.

The action of air on the extractive of mould dissolved in water is limited by the absorption of oxygen; carbonic acid is formed, which remains dissolved in the solution, and a brown or black deposit of the oxydated humus, as it is called, is generated. The formation of carbonic acid and this deposit go on independently of each other; but in the fluid which contains the roots,

the carbonic acid formed is perpetually removed. It cannot contain either free carbonic acid or free oxygen, simply because both are absorbed. In the latter arrangement, then, all conditions are present, for allowing the air to act continually on the organic matter contained therein.

[To be continued.]

## PRACTICAL PHARMACY.

ART. XIII.—*New Method of Preparing Spiritus Etheris Nitrici, adapted for Manufacturers.* By Dr. GEISELER.

LET 24 ounces of rectified spirits of wine, sp. gr. 0·840, be mixed with 4 ounces of concentrated sulphuric acid, sp. gr. 1·845; allow it to stand for 8 days, and then pour the mixture on 4½ ounces of perfectly dry saltpetre, previously introduced into a distilling vessel; adapt the head and receiver thereto, and draw over with a moderate fire 20 ounces of the liquid, which may be rectified with magnesia. Prepared in this manner, a copper still, with a tin head and refrigerator, may be employed. Another advantage is, that the ethereal product thus obtained is not very subject to decomposition. A mixture of pure nitric ether and spirits of wine will not furnish an officinal *spiritus etheris nitrici*, since this latter contains, in addition to the components of the former, aldehyd. It cannot be preserved over magnesia or bicarbonate of potassa (see Phar. Trans. p. 354), since these additions induce decomposition and formation of nitrate of the alkali.—*Arch. d. Pharm.*

## ART. XIV.—*Officinal Iodide of Potassium*

USUALLY contains, according to Woehler, iodate of potassa and carbonate of potassa, more especially that iodide which is furnished by manufacturers on the large scale. Herzog has shewn the composition of that prepared according to the Pharm. Borr. The salt of the Pharm. Hanov. frequently contains also iodate of potassa, since it is only completely reduced by the long-continued action of sulphuretted hydrogen. The best method is by decomposing the iodide of iron with carbonate of potassa at a boiling temperature. The difficulty is, to hit the precise point of decomposition, so that neither iodide of iron nor carbonate of potassa may remain in excess. The latter fault is easily amended by the addition of hydriodic acid.—*Annalen d. Chem. u. Pharm.*

[In the last number will be found a formula for preparing iodide of iron without heat. It need scarcely be stated, that by

using pure iodine, and availing himself of the suggestions of Dr. Geiseler as to the quantity of iodide contained in a given solution, the manufacture of the above salt is rendered less difficult, but, from the elaborate article which will be found in this number, the assertion of Woehler would appear at least doubtful.—ED.]

ART. XV.—*On the Preparation of Iodide of Potassium; being a Digest of a Treatise on the above Preparation, which gained the Prize of the Hagen Bucholzian Foundation.* By OTTO ENER.

FROM the results detailed in this treatise, it appears that the methods of making this salt with liver of sulphur and iodine, and with iodide of antimony, are quite impracticable; that it has several times been proved no perfect product can be obtained according to the formula of the Pharmac. Boruss.; that the formula with iodide of iron and iodide of zinc are not impracticable, but more expensive than either the method of Turner or by means of caustic potassa. Since, however, the latter process, for procuring an iodide of potassium, has several inconveniences attending it, while that of Turner has only this, that it is contaminated with a little sulphate of potassa, this latter (Turner's) maintains the preference already adjudged to it by Herzog.

#### PREPARATION BY MEANS OF IODIDE OF IRON.

For testing the formula given by Baup, 1 ounce of iodine, half an ounce of iron filings, and 6 ounces of distilled water, were mixed in a flat porcelain vessel. The liquor rapidly assumed a dark-brown colour, evolving considerable heat; wherefore it is proper, in preparing large quantities, to add the iodine gradually, in order to avoid its partial loss. After the reaction had diminished, the decolorisation of the liquid was aided by slightly heating. The solution of iodide of iron thus obtained was then quickly removed by filtration from the residuary iron filings, and these were then washed with 12 ounces of distilled water, and then tested to ascertain the presence of iodine supposed to be present, but did not show any traces thereof.

The solution of iodide of iron thus obtained showed a feebly acid reaction, and was of a greenish colour. It was now instantly mixed with a solution of carbonate of potassa, until a precipitate ceased to be produced. Notwithstanding every precaution that had been taken, a small excess of the precipitant could not be avoided. The precipitate, which was very voluminous, was then gathered on a filter, and washed with distilled water, until the fluid passing through did not become turbid by the addition of a solution of silver. This washing required a quantity of 84 ounces of distilled water.

The solution of iodide of potassium, which had again become

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turbid by disengaged oxide of iron, was then, together with the whole of the water used for washing, condensed to dryness, during which operation a quantity of oxide of iron was disengaged, and for a similar reason the residuary salt obtained was also tinged yellow. On account of its alkaline reaction, the iodide of potassium was treated at a boiling temperature with 12 ounces of spirits of wine, when it left behind a brown saline mass, which was found to consist of carbonate of potassa and oxide of iron. From the alcoholic solution of iodide of potassium 10 ounces of spirits of wine were regained by distillation. The iodide of potassium thus obtained, weighing one ounce and two drachms, was perfectly neutral, and free from iron, but it had a yellowish appearance, which had been caused by merely dissolving it in spirits of wine, for by redissolving it in water and crystallisation it was obtained white, leaving only a small quantity of a yellow mother liquor behind.

In order to shorten this long and tiresome process of washing out the precipitate of protoxide of iron, the iodide of iron, obtained from an equal quantity of iodine, as above stated, was on the occasion of preparing another batch quickly heated in a flat porcelain vessel, then decomposed by carbonate of potassa, and maintained hot for about half an hour over the water bath. Meanwhile a considerable evolution of carbonic acid took place; the precipitate obtained was less by at least half its volume than that obtained in the cold, and 62 ounces of water were perfectly sufficient to remove from it every trace of iodide of potassium. The ley of iodide of potassium thus obtained was clear like water, but whilst evaporating disengaged some flakes of oxide of iron, on the removal of which, a salt, perfectly free from iron, remained.

With a third preparation, following the same process, with this exception only, that instead of washing the precipitate of protoxide of iron with cold water, hot water was employed, no oxide of iron at all was separated during the evaporation of the iodide of potassium; which fact may be accounted for in this way—that distilled water, when kept, always absorbs some carbonic acid from the air, which then acts on the precipitate, dissolving the magnetic oxide of iron (protoxide and sesquioxide).

By observing these precautions it is quite unnecessary to resort to the process of Du Mênil (*Pharm. C. Bl.* 1836, p. 733), in order to obtain a preparation perfectly free from iron.

According to the results here obtained, the following rules must be observed if the preparation of the iodide of potassium is to be undertaken by this method:—

1. The solution of iodide of iron obtained must be filtered as quickly as possible, and decomposed by carbonate of potassa.
2. It is proper to manage the decomposition of the iodide of

iron whilst warm, which procures not only a less voluminous precipitate, but if the heating be continued for a sufficiently long time, a solution free from iron. It is less easy, however, to obtain the last crystallisations free from carbonate of potassa; and it is necessary, if the residues are not to be kept for another preparation, either to saturate with hydriodic acid, or to digest the saline residue in spirits of wine. This latter operation, however, always causes a loss of spirits of wine.

4 ounces of iodine were then, with strict observation of the experience obtained during previous experiments, treated with iron filings, &c. The solution of iodide of iron was diluted with 16 ounces of water, heated over a water bath, and decomposed with 2 ounces, 3 drams, and 29 grains of potassæ carbonas e tartaro, dissolved in 6 ounces of distilled water. After heating for half an hour, the precipitate was collected on a filter, and washed without interruption with 97 ounces of distilled water, heated to  $+70^{\circ}\text{C.} = 158^{\circ}$ . The colourless clear solution of iodide of potassium obtained was perfectly free from iron, and did not disengage flakes whilst evaporating for crystallisation.

The first crystallisation yielded 2 ounces, 2 drams, and 55 grains of a perfectly neutral white iodide of potassium, crystallized in cubes. By two succeeding crystallisations, 2 ounces, 2 drams, and 19 grains more were obtained, which, however, showed a feeble alkaline reaction, although so inconsiderable that the salt is not thereby rendered unfit for pharmaceutical use. The mother liquor, which remained, crystallised indeed likewise, but the crystals showed a strong alkaline reaction; so that in order to ascertain the contents of pure iodide of potassium contained therein, it was evaporated to dryness, and two scruples thereof extracted with spirits of wine.

[To be continued.]

## GALVANISM AND ELECTRICITY.

ART. XVI.—*On certain Galvanic Series constructed with Chromic Acid.* By T. C. POGGENDORFF.

[Continued from page 160.]

If the numbers obtained with nitric and chromic acids are compared, they yield the following results:—

1. The electromotive power in the experiment with charcoal is very strong, and nearly alike in both acids—perhaps somewhat greater in the chromic; but, leaving out of consideration the fact that the current, and probably also the power when the latter fluid is employed, are inconstant, the essential resistance is likewise found to be nearly twice as great as that observed when

nitric acid is employed. Both these results are caused, I presume, by the circumstance that, notwithstanding the proportion of sulphuric acid employed, oxide of chromium is disengaged in the pores of the charcoal.

2. In the case of chromic acid with platina, the power is only about two-thirds of that produced by nitric acid, although the strength of acid used was intentionally not more concentrated than the *acidum nitricum crudum* of the druggists. The power is not much greater than that which is evolved by copper excited by chromic acid, and remains rather less than that which the same metal yields when immersed in a solution of sulphate of copper.

This circumstance appears to me remarkable. The application of chromic acid has been devised because its oxygen is easily separated; and, therefore, it is either reduced by the action of the current at the negative plate previous to the water, or, if afterwards, the hydrogen is again immediately oxidated at the moment of production. The powerful effect of this and similar liquids is attributed, by the followers of the chymical theory, to the suppression of the hydrogen, which is equally complete in both cases, as well as to the avoidance of other obnoxious matters on the negative plate. If, however, this was the only service which such liquids had to perform in the voltaic pile, we should be inclined to think that each of them must, *ceteris paribus*, exert an equally powerful electromotive force.

This, however, is not the case. On a previous occasion I have observed, that a solution of chloride of platina employed in lieu of nitric acid, will not exert the same power as the latter liquid, although the evolution of hydrogen is, in like manner, perfectly prevented by both one and the other. In this case the difference, perhaps, might be said to have been caused by the circumstance that the sulphuric acid in which, under both arrangements, the zinc was immersed, and which was in contact with the second fluid, might have some other affinity for, or relation to, the solution of platina different from that possessed by the nitric acid. Escape by this supposition is, however, in the present case, impossible; for we observe that chromic acid with platina not only evolves a considerably less degree of force than sulphuric acid with platina, but also an equally less power in comparison with that which it evolves when in combination with charcoal, although in both cases the second fluid was the same—that is to say, sulphuric acid. The merely chymical action which takes place with charcoal being so feeble, is equally incapable of affording a satisfactory explanation; since the process which oxidates the negative plate, and reduces the fluid, ought not, according to the chymical theory, to increase the power in a combination of zinc and charcoal, but on the contrary

weaken it, and render it still less powerful than a combination of zinc and platina, whose negative element does not undergo such oxidation. There remains, therefore, no other explanation than that afforded by the contact theory, and which seems to me to obtain new confirmation by the preceding facts. It is this:—that liquids possess the property of modifying the electrical relation of metals, and other solid conductors, in a manner at present unknown to us, and in very different degrees.

Respecting the value of chromic acid for galvanic purposes, it appears, from the preceding results, that among the three combinations therein arranged, that with platina is the least advantageous. The two others are evidently better: that with charcoal, because it furnishes, if not a constant current, at any rate the strongest relatively for a longer time; whilst that with copper is to be recommended on account of the constancy of its current, and, at the same time, even when exposed to considerable resistance, it is much more powerful than that with platina.

In all these combinations, however, chromic acid is still, for power and constancy of current, far behind nitric acid, offering no other advantage over the latter than the absence of nitrous acid fumes during its application, which, indeed, in a confined space, are very noisome and disagreeable. This inconvenience may be much moderated, it is true, if the nitric acid employed is only concentrated to 1·30 sp. gr., which is sufficient for many purposes at any rate, and provided also the clay cylinders are furnished with covers. For myself I can assert, after much experience, that with batteries of small dimensions, and by removing the apparatus to a side room on the addition of the acid, which always causes the greatest evolution of fumes, this inconvenience is so inconsiderable that experiments may be conducted very well in a sitting-room. For those, however, who, notwithstanding this assertion, apprehend an injurious effect on their health, or on instruments situate near the apparatus, chromic acid is to be preferred, especially if the object is to attain a constant current by means of a copper arrangement; which indeed is somewhat acted upon, but on account of its proportionately low price, admits of the construction of a battery of considerable dimensions.

It is very advisable to employ batteries of large dimensions, since they secure, besides increased strength of current, this advantage, that the quantity of the liquid may be meanwhile increased in still greater proportion. This circumstance is favourable to the duration of the current, for otherwise, in order to preserve a constant current for a long time, the continual addition of fresh liquid would be required.

Chromic acid, in the highest degree concentrated, as employed for the above experiments, is not a very rich source of

oxygen, and therefore not of long duration. On calculating the relative quantities of oxygen to be obtained for the oxidation of the greatest quantity of hydrogen from solutions of sulphate of copper, chromic fluid, and nitric acid of the above-mentioned densities, and of a volume equal to 1000 parts by weight of water, the reduction of nitric acid being calculated as  $N_2O_3$ , it will be found\*,

|                                                  | Oxygen parts by weight. |
|--------------------------------------------------|-------------------------|
| For the solution of Sulphate of Copper . . . . . | 15.39                   |
| „ Chromic Fluid . . . . .                        | 22.81                   |
| „ Nitric Acid . . . . .                          | 156.11                  |

Nitric acid, of the moderate concentration of 1.30 specific gravity, is, then, a much richer store of oxygen than the chromic liquid even in its greatest state of density, and the latter holds out only one and a half times longer than the saturated solution of sulphate of copper, which, besides this, after being exhausted, can be fed with fresh portions of substances for absorbing the hydrogen, much easier than the chromic fluid, and without requiring to be entirely renewed. If, therefore, a constant current has to be maintained for a long time by means of chromic acid, and we wish to avoid the inconvenience of artificial arrangements for the purpose of continually renewing the solution, a considerable quantity thereof must be employed in the first instance. This supply, when nitric acid is used, is required to a much less extent, as is apparent; and from this circumstance alone it is far preferable to all similar oxidating fluids.

Before I leave this subject, I may add, that I likewise constructed a series composed of amalgamated zinc, copper, and

\* For instance,

$$\begin{aligned} \text{Sulphate of Copper} &= \text{Cu O, SO}_3, 5\text{H}_2\text{O} = 1559.26 \\ 4 \times 1559.26 \text{ of Water,} &= 6237.04 \end{aligned}$$

$$\text{Solution of Sulphate of Copper} = 7796.30$$

In 1200 parts by weight of the solution, which, taking for the specific gravity of 1200 the volume of one contains, therefore, an available quantity of oxygen =  $x$ , which is found from the proportion—

$$7796.30 : 100 :: 1200 : x = 15.39$$

For the chromic liquid there is contained—

$$\begin{aligned} \text{Bichromate of Potassa} &= \text{KO, 2CrO}_3 = 1893.55 \\ \frac{2}{3} + 1893.55 \text{ of Hydrated Sulphuric Acid} &= 2524.73 \\ 6 \times 1893.55 \text{ of Water} &= 11361.30 \end{aligned}$$

$$\text{Composing Chromic Fluid} = 15779.58$$

By reduction of the chromic acid to oxide of chromium this fluid loses  $3\text{O} = 300$ ; therefore is—

$$15779.58 : 300 :: 1200 : x = 22.81$$

Nitric acid, of 1.300 specific gravity = 1 volume, contains 40.65 per cent. of anhydrous acid,  $N_2O_3$ ; or in 1300 parts by weight there are contained 528.45 of oxygen. If these, then, lose 2 atoms of oxygen, we have—

$$N_2O_3 : O :: 677.04 : 200 :: 528.45 : x = 156.11$$

simply chromic fluid, of the before stated density; with this combination hoping to solve the problem of a constant current, by employing only one fluid, for which purpose it seemed to afford some probability of success. My expectations, however, were not fulfilled, as the following results will show, in which the size, distance, and immersion of the plates, were the same as in the previously narrated experiments:—

| Time.  | Non-essential resistance. | Strength of the current. | Essential resistance. | Electromotive power. |
|--------|---------------------------|--------------------------|-----------------------|----------------------|
| 9h 15' | 26·27                     | Sta. 27° 4               | 5·07                  | 13·84                |
| 17     | 26·27                     | 26 59                    |                       |                      |
| 23     | 26·27                     | 26 13                    |                       |                      |
| 25     | 26·27                     | 19 34                    |                       |                      |
| 38     | 26·27                     | 23 14                    |                       |                      |
| 41     | 26·27                     | 22 14                    |                       |                      |

The current was therefore decreasing, and continued decreasing more and more rapidly during the observation. I therefore believe that the decrease was not produced by any polarization, as this could not easily take place, on account of the action of chromic acid on the copper; at any rate, polarization did not exist in a perceptible degree, and if indeed it really did occur, as on a consideration of other analogous well-ascertained facts, such decrease should have thereby diminished. I am rather inclined to attribute the inconstancy of the current as caused by the rapid decomposition of the chromic liquid, a decomposition occasioned by the great solubility of zinc in this acid, and whose action is so vivid when this metal is present, even without galvanic action, that it occasions, arising from the non-evolution of gas, a strong development of caloric. This great loss of zinc alone prevents the practical application of this combination; in a theoretical point of view it is, however, interesting, since so strong a current as that yielded by this arrangement, and which, on comparison, will be found far surpassing that of Daniell's series, especially under diminished resistance, has never been hitherto produced with *one* liquid. The requisite constancy might perhaps be given to this current by continually renewing the chromic acid by the addition of a solution somewhat less concentrated than that employed.—*Poggendorff's Annalen*, Bd. lvii.

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ART. XVII.—*A new and easy Method of covering Copper and Brass with Platina.*

ONE part of solid chloride of platina is dissolved in 100 parts of water, and to this solution is added 8 parts of common salt; or, still better, 1 part of platino-chloride of ammonia, and 8 parts of

hydrochlorate of ammonia are placed in a flat porcelain vessel, 32 to 40 parts of water poured over it, the whole heated to boiling, and the vessels of copper or brass, perfectly bright, are placed therein. They will be covered in a few seconds with a brilliant and firmly adhering layer of platina.

There is no doubt that this method may be employed with the greatest advantage in pharmaceutical laboratories.

ART. XVIII.—*On the Reduction of Solutions containing Platina, by Means of Zinc.*

THE process recommended by Parisot has been found practically useful. It is as follows:—The salt containing platina or its solution is mixed with some sulphuric acid, and a piece of zinc put into it. The black precipitated metallic platina adhering to the zinc is removed by means of the same acid.

ART. XIX.—*On Tinning and Zincing Copper and Brass by the Moist Way.*

PLATES of copper or brass placed in a boiling solution of stannate of potassa mixed with turnings of tin, are, in the course of a few minutes, covered with a firmly attached bright layer of tin—a method very useful for tinning pharmaceutical instruments\*.

A layer of zinc may also be obtained on the same metals by employing chloride of zinc: pure zinc turnings being present. The same object can be attained by means of zinc and a solution of hydrochlorate of ammonia.—*Boettger's Beitrage.*

ART. XX.—*On Coloured Fires.*

*To the Editors of the Annals of Chymistry and Pharmacy.*

GENTLEMEN,—In reply to your correspondent PHILO, there are very many recipes for Coloured Fires, differing in some slight degree from each other. The following I believe, *from experience*, to be the best:—

\* The same experiment, remarks Mr. Wittstein, was performed by Trommadorff fifty years ago. I will here give his own words (in Götting's Taschenbuch für Scheidekünstler und Apotheker Jahrgang, 1791, s. 128) on this subject.

"*Singular tinning by the moist way.*—Several vessels of pure English tin were boiled in a portion of caustic ley, in order to clean them. The ley was decanted, and remained standing during one night in a copper kettle for further use. The following day, when the kettle was employed, the surface of it, so far as it had been covered by the ley, was discovered to be tinned; and the kettle was used for a long time before this tinning was worn out. Although this might not prove a very economical means for tinning vessels, it might perhaps be employed with advantage in those vessels the shape of which does not admit of their being tinned in the common way."

Further, he states, in the same work, in the year 1792, p. 193:—

"Last year I announced to the public the observation, that caustic fixed vegetable alkali dissolves zinc by the moist way, and is precipitated therefrom in a metallic form by copper: I have since repeated the experiment with complete success. Caustic mineral alkali, and volatile mineral alkali, show the same phenomenon, but it does not always succeed so well as with vegetable alkali."—*Buchner's Repert.*

**Red Fire.**—Sulphur, 1 ounce; Sulphuret of Antimony, 1 ounce; Chlorate of Potass, 1 ounce; Nitrate of Strontian, 5 ounces. The Chlorate of Potass, being previously well powdered, should be mixed carefully on a paper with the Sulphuret of Antimony, and afterwards the remaining ingredients should be added, and well mixed with a spatula on paper.

**Blue Fire.**—Nitrate of Barytes, 77 parts; Sulphur, 13 parts; Chlorate of Potass, 5 parts; Realgar, 2 parts; Charcoal, 3 parts. Mix them thoroughly.

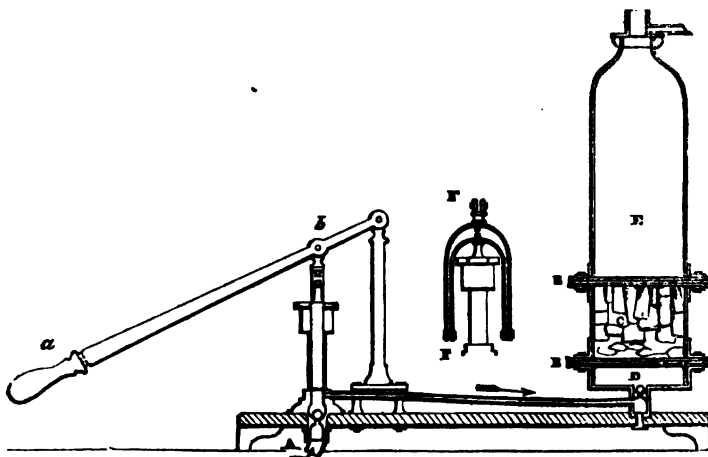
**Purple.**—Lamp Black, 1 part; Realgar, 1 part; Nitre, 1 part; Sulphur, 2 parts; Nitrate of Strontian, 16 parts; Chlorate of Potass, 5 parts.

Yours obediently,

G. T. F.

### ART. XXI.—*New Hydraulic Filter.*

*To the Editors of the Annals of Chymistry and Pharmacy.*



- 1 A. A conducting or suction tube, through which the fluid is to be drawn.
- BB. Flanges which bind the filtering media; consisting, first, of a peculiarly woven thick flannel, then felt, and next another layer of flannel, with sand, glass, or filtering paper, between.
- C. Reservoir for the muddy deposit which will not pass the media.
- D. Charcoal, powdered glass, or sand; or if used for percolation *per ascension*, reservoir for ingredients to be exhausted.
- E. Reservoir of filtered liquid, which overflows at the top.
- FF. Arrangement of the slings, contrived so as to secure parallel motion in the most compact manner.

THIS little apparatus was contrived by me, in order to secure the rapid filtration of concentrated decoctions, essences, solutions of extracts, and those preparations of vegetable substances which are liable to decomposition, if exposed, for a moderate time only, to atmospheric



influence. Although only occupying the space of a few inches, it is capable of filtering, perfectly bright, three gallons per hour, of a muddy, thick liquor; and, of course, a larger apparatus will filter a proportionately increased quantity.

It is admirably adapted for bleaching and filtering castor oil, without injuring the oil; a little warmth, and pure animal charcoal as the bleaching ingredient, being all that is requisite: it will serve also to introduce a new era in the practice of percolation, the process being *per ascensum*, in lieu of *per descensum*; since the same liquid may be rapidly and frequently passed through the ingredients, without the possibility of clogging—an important point in exhausting opium of its soluble constituents. The unpractised pharmacist who may have attempted to make a few gallons of tincture by means of the percolator etched in recent works on Pharmacy, will appreciate the advantage of an arrangement in which the ingredients can never be packed too closely. One advantage it has over many filters, is, that a very small portion only of the contents are left in the filter; in mine about one ounce only, and yet I can filter at the rate of thirty gallons of castor oil in one day, and wash the apparatus clean in ten minutes.

**DESCRIPTION.**—It consists of a force pump, the diameter of whose solid piston is one-sixth the diameter of the filtering media, such pump being worked by a lever handle *a*, giving an increase of about twelve times the power that would be obtained without such lever. Assuming the diameter of the pump to be *half an inch*, and the filtering media BB as *three inches*, this will be about twelve times the content of the former; and as the lever increases this power twelve times, we shall have the enormous power of 144 times the force exercised on the handle of the lever, impelling the liquid through the filtering media. If we apply, then, on the handle the force of 100 lbs., we shall have a force of 14,400 lbs. impelling the liquid through the media.

This power, which may be increased by the application of the same principle to any extent, no filtering media whatever can impede; we may send our liquid through columns of powders, animal charcoal, sand, flannels, felt, leather, &c. &c., until we have either exhausted all the soluble portions of a substance, or saturated our liquid to the consistence of treacle, at the same time filtering it as bright as possible; and the rapidity with which these processes can be performed, is, in the case of vegetables, of manifest advantage. Torturing vegetables, by stewing, brewing, and evaporating, may be dispensed with, and the grand desideratum of completing the extraction of all the soluble portions of a dry vegetable substance at the same temperature at which it vegetates, is attained.

It is well adapted for driving water through animal or wood charcoal, to render it fit for washing precipitates, &c. A smaller apparatus, for experiment, may be constructed, using a syringe for the forcing pump.

Should the above description and accompanying sketch be suitable for the pages of your journal, its insertion is very much at your service—a humble mite to the treasury of Pharmacy.

I am, Gentlemen, your obedient servant,

Oct. 31, 18842.

G. M. M.

#### ART. XXII.—*On the Oxidation of Alcohol by Means of Chromic Acid.*

CHROMIC acid, as well as other substances, (for instance, spongy platina,) converts alcohol into a liquid containing aldehyd, lamic acid, ethereous acid. If some dry chromic acid is thrown into absolute alcohol, it becomes suddenly red-hot, is reduced to protoxide, and, if the alcohol is only in very small quantity, it takes fire. Absolute alcohol, mixed with sulphuret of carbon, takes fire on the admission of the slightest trace of dry chromic acid; whilst sulphuret of carbon alone is scarcely affected by it. These experiments have been made with common chromic acid; that is to say, chromic acid contaminated with sulphuric acid, according to Tritsche's method\*.

THE SOLUBILITY OF LEAD IN ALL WATER CONTAINING FREE CARBONIC ACID.—Previous to the year 1757, A.D., lead-colic was very rarely met with in Amsterdam. Soon after, however, the citizens began to substitute lead for tiles on the roofs of their dwelling-houses, and the disease broke out with violence, and committed great ravages. Dr. Frouchin very properly ascribed its increase to lead entering the body insidiously along with the water, which he inferred had acquired the power of corroding the lead by having become acid (impregnated with carbonic acid gas) in consequence of the roofs having been covered with decaying leaves from the trees which abounded in the city; and without a doubt this explanation accords with the season at which the lead-colic was observed to be most frequent; namely, the autumn.

Sir G. Baker, in a letter to Dr. Heberden, has related another striking instance. Lord Ashburnham's house in Sussex was supplied from some distance with water, which was conveyed in leaden pipes. The servants being often affected with colic, which had even proved fatal to some of them, the water was carefully examined, and found to contain lead. The solvent power of the water was ascribed, very properly, to its containing an unusual quantity of carbonic acid gas.—*Christison on Poisons*. [This subject is fully treated in the admirable work just quoted.]

ATOMIC WEIGHTS OF ELEMENTS.—MM. Marchond and Erdmann are at present engaged in a series of researches which seem to prove that Prout's idea of all atomic weights being multiples of hydrogen is correct. They have as yet examined only the following bodies:—

|                             |                             |
|-----------------------------|-----------------------------|
| Oxygen = 100 . . . . . 1    | Calcium = 250 . . . . . 20  |
| Hydrogen = 12.5 . . . . . 8 | Chlorine = 450 . . . . . 36 |
| Carbon = 75 . . . . . 6     | Silver = 1250 . . . . . 100 |
| Nitrogen = 175 . . . . . 14 | Lead = 1300 . . . . . 104   |

*Phil. Mag. Nov.*

\* Or Warrington's. See Proceedings of the Chymical Society.—Ed.

| NOMINA.                          | FORMULÆ.                         |
|----------------------------------|----------------------------------|
| <i>Acidum</i> Uranicum . . . . . | $\ddot{U}_4^3$ . . . . .         |
| — Uricum . . . . .               | $\bar{U} = N^3 C^{10} H^6 O^4$   |
|                                  | $\bar{U}^1$ . . . . .            |
|                                  | $\bar{U}^2$ . . . . .            |
| — Vanadicum. . . . .             | $\ddot{V}$ . . . . .             |
|                                  | $\ddot{V}^1$ . . . . .           |
|                                  | $\ddot{V}^2$ . . . . .           |
| — Vanadosum. . . . .             | $\ddot{V}$ . . . . .             |
|                                  | $\ddot{V}^1$ . . . . .           |
|                                  | $\ddot{V}^2$ . . . . .           |
| — Wolframicum . . . . .          | $\ddot{W}$ . . . . .             |
|                                  | $\ddot{W}^1$ . . . . .           |
|                                  | $\ddot{W}^2$ . . . . .           |
| <i>Æther.</i> . . . . .          | $\dot{Ae}_4 = C_4^3 H_8^3 O$ .   |
| Oxidum Ætherosum.                | 2 . . . . .                      |
|                                  | 3 . . . . .                      |
| Radicalis Æthericum.             | $\dot{Ae} = C^1 H^1$ . . .       |
|                                  | $\dot{Ae}_1$ . . . . .           |
| — Aceticus. . . . .              | $\dot{Ae}_1 \bar{A}$ . . . . .   |
| Acetas Ætherosus.                |                                  |
| — Benzoicus. . . . .             | $\dot{Ae}_1 \ddot{Bz}$ . . . . . |
| Benzoas Ætherosus.               |                                  |
| — Citricus. . . . .              | $\dot{Ae}_1 \bar{C}$ . . . . .   |
| Citras Ætherosus.                |                                  |
| — Formicus. . . . .              | $\dot{Ae}_1 \bar{F}$ . . . . .   |
| Formias Ætherosus.               |                                  |

| PONDERA ATOMORUM. |                    | PARTES CENTESIMALES.           |                    |                      |
|-------------------|--------------------|--------------------------------|--------------------|----------------------|
| O = 100           | H <sup>a</sup> = 1 | + E                            | — E                | H vel H <sub>2</sub> |
| 17168,15          | 1875,70            |                                |                    |                      |
| 1909,96           | 153,05             | NC=77,10<br>N=37,08<br>C=40,02 | O=20,94            | H=1,96               |
| 3819,91           | 306,09             |                                |                    |                      |
| 5729,87           | 459,14             |                                |                    |                      |
| 1156,89           | 92,70              | 74,07                          | 25,93              |                      |
| 2313,78           | 185,40             |                                |                    |                      |
| 3470,68           | 278,11             |                                |                    |                      |
| 1056,89           | 84,69              | 81,08                          | 18,92              |                      |
| 2113,78           | 169,38             |                                |                    |                      |
| 3170,68           | 254,07             |                                |                    |                      |
| 1483,00           | 118,83             | 79,77                          | 20,23              |                      |
| 2966,00           | 237,67             |                                |                    |                      |
| 4449,00           | 356,50             |                                |                    |                      |
| 468,15            | 37,51              | Ae=78,64<br>C=65,31            | O=21,36<br>O=21,36 | H=13,33              |
| 936,30            | 75,03              |                                |                    |                      |
| 1404,44           | 112,54             |                                |                    |                      |
| 184,07            | 14,75              | C=83,05                        | H=16,95            |                      |
| 368,15            | 29,50              |                                |                    |                      |
| 1111,34           | 89,05              | Ae <sub>2</sub><br>42,12       | 57,88              |                      |
| 1900,67           | 152,30             | 24,63                          | 75,39              |                      |
| 1198,86           | 96,07              | 39,05                          | 60,95              |                      |
| 933,50            | 74,80              | 50,15                          | 49,85              |                      |

| NOMINA.                            | FORMULÆ.                                   |
|------------------------------------|--------------------------------------------|
| <i>Ether Hydrobomicus.</i> . . . . | $\text{Ae}_2 \text{Br}_2$ . . . .          |
| Brometum Ætherosum.                |                                            |
| — <i>Hydrochloricus.</i> . . . .   | $\text{Ae}_2 \text{Cl}_2$ . . . .          |
| Chloretum Ætherosum.               |                                            |
| — <i>Hydroiodicus.</i> . . . .     | $\text{Ae}_2 \text{J}_2$ . . . .           |
| Jodetum Ætherosum.                 |                                            |
| — <i>Jodicus.</i> . . . .          | $\text{Ae}_2 \text{J}_2$ . . . .           |
| Jodas Ætherosus.                   |                                            |
| — <i>Nitrosus.</i> . . . .         | $\text{Ae}_2 \ddot{\text{N}}_2$ . . . .    |
| Nitris Ætherosus.                  |                                            |
| — <i>Oxalicus.</i> . . . .         | $\text{Ae}_2 \ddot{\text{C}}_2$ . . . .    |
| Oxalas Ætherosus.                  |                                            |
| <i>Ætherina.</i> . . . .           | $\text{E} = \text{C}^4 \text{H}^2$ . . . . |
| <i>Alkohol.</i> . . . .            | $\text{C}_2 \text{H}_5^3 \text{O}$ . . . . |
| <i>Alumina.</i> . . . .            | $\text{Al}_2$ . . . .                      |
| <i>Aluminium.</i> . . . .          | $\text{Al}$ . . . .                        |
| <i>Ammoniacum.</i> . . . .         | $\text{Al}_2$ . . . .                      |
|                                    | $\text{NH}_3^3$ . . . .                    |
|                                    | $\text{NH}_3^3$ . . . .                    |
|                                    | $2\text{NH}_3^3$ . . . .                   |
|                                    | $3\text{NH}_3^3$ . . . .                   |
| <i>Ammonium.</i> . . . .           | $\text{NH}_4^4$ . . . .                    |
|                                    | $\text{NH}_4^4$ . . . .                    |
|                                    | $2\text{NH}_4^4$ . . . .                   |
|                                    | $3\text{NH}_4^4$ . . . .                   |
| <i>Aqua.</i> . . . .               | $\text{H}_2$ . . . .                       |
|                                    | $2\text{H}_2$ . . . .                      |
|                                    | $3\text{H}_2$ . . . .                      |
|                                    | $4\text{H}_2$ . . . .                      |
|                                    | $5\text{H}_2$ . . . .                      |
|                                    | $6\text{H}_2$ . . . .                      |
|                                    | $7\text{H}_2$ . . . .                      |
|                                    | $8\text{H}_2$ . . . .                      |

| PONDERA ATOMORUM. |                    | PARTES CENTESIMALES.      |         |                      |
|-------------------|--------------------|---------------------------|---------|----------------------|
| O = 100           | H <sub>2</sub> = 1 | + E                       | — E     | H vel H <sub>2</sub> |
| 1346,45           | 107,89             | Ae <sub>2</sub><br>27,34  | 72,66   |                      |
| 810,80            | 64,97              | 45,41                     | 54,59   |                      |
| 1947,65           | 156,07             | 19,90                     | 81,10   |                      |
| 2047,65           | 164,08             | Ä <sub>2</sub> e<br>22,86 | 77,14   |                      |
| 945,18            | 75,74              | 49,53                     | 50,47   |                      |
| 921,02            | 73,80              | 50,83                     | 49,17   |                      |
| 355,67            | 28,50              | C=85,96                   | H=14,04 |                      |
| 711,34            | 57,00              |                           |         |                      |
| 290,31            | 23,26              | C=52,66                   | O=34,44 | H=12,90              |
| 642,33            | 51,47              | 53,30                     | 46,70   |                      |
| 171,17            | 13,72              |                           |         |                      |
| 342,33            | 27,43              |                           |         |                      |
| 107,24            | 8,59               | 82,54                     | 17,46   |                      |
| 214,47            | 17,19              |                           |         |                      |
| 428,95            | 34,37              |                           |         |                      |
| 643,42            | 51,56              |                           |         |                      |
| 113,48            | 9,09               | N=78,00                   | H=22,00 |                      |
| 226,95            | 18,19              |                           |         |                      |
| 453,91            | 36,37              |                           |         |                      |
| 680,86            | 54,56              |                           |         |                      |
| 112,48            | 9,01               | 11,09                     | 88,91   |                      |
| 224,96            | 18,03              |                           |         |                      |
| 337,44            | 20,04              |                           |         |                      |
| 449,92            | 36,05              |                           |         |                      |
| 562,40            | 45,07              |                           |         |                      |
| 674,88            | 54,08              |                           |         |                      |
| 787,36            | 63,09              |                           |         |                      |
| 899,84            | 72,11              |                           |         |                      |

## AN IMPROVED CHAMBER-LIGHT.

*To the Editors of the Annals of Chymistry and Pharmacy.*

GENTLEMEN,—I take the liberty of sending you an account of a night chamber-light which I have employed with satisfaction for the last twelve months. The rush being apt to fail, and the oil light, unless skilfully managed, occasioning obvious inconvenience, I was led to the following contrivance, which may be considered an improvement on the old fat light with a paper wick:—I employ a common cylindrical ointment pot, a two oz. size in the winter; in the summer a smaller one. This is filled with any kind of fat. I usually have it filled with the waste fat from the kitchen. This is trimmed by about half an inch of the common wax wick sold at the tallow-chandler's, being simply stuck into a thin slice of a wine-bottle cork, upon which I first place a strip of stout filtering paper; this is about half the diameter of the cork in breadth, and a diameter and a half in length. It need not be quite so broad, but it must be at least the length stated. The reason for using the bibulous paper is, that it feeds the wick properly; without it, or some such contrivance, it will not burn.

I remove with the handle of a tea-spoon sufficient of the fat to allow the cork to be a little below the surface, and then place the fat so removed over the cork and paper, neatly spreading it, to make an even surface. The light is now prepared. I think the plan might be improved, for the convenience of those who are not early risers, by having an aperture at the bottom of the pit, and placing it in water, which would rise to the level when the fat is melted, and extinguish the wick when it is exhausted. If not extinguished when the fat is burned up, the cork, &c. will be consumed, and occasion an unpleasant smell.

Q X.

I do not know whether the following observation has been recorded:—It is well known that the *Rad. anchusa* will impart a beautiful red colour to oils. Some years ago I coloured some *Ol. Tereb.* with this root, and filled the bull's eyes of my lamp with it. This was in the autumn. It seemed to answer very well. The red lights were brilliant; but after a frosty night in the winter, instead of a bright red light, my glasses transmitted a dull yellow; all the red had disappeared.

I am, gentlemen, your obedient servant,

Q X.

London, 27th Oct. 1842.

DIFFERENT EFFECTS OF ARSENIC ON DIFFERENT PERSONS.—At the conclusion of an inquest held last week before Mr. Wakley, M.P., relative to the death of a party suspected to have been poisoned by arsenic, or some other corrosive poison, the honourable gentleman observed how extraordinary it was that arsenic should have an entirely different action on two different subjects. Two persons shall take the same quantity of arsenic. On the one it shall act just like an anodyne, soporifically, first producing somnolency, and finally ending in the sleep of death, without pain or struggle. In the other, after it has been taken into the stomach, it shall produce violent vomiting and extreme agony, which shall continue until death takes place in the midst of excruciating torture. In the first instance, after death, dissection will show no internal ulceration. In the second it will present marked appearances of the most violent inflammatory action. He was constantly struck with surprise at seeing, in cases where the precise causes of death were surely known, the *post-mortem* appearances disagreeing *in toto* from what they ought to be, considering the cause of death. Medical men should bear these facts in mind when they are called upon to give forensic evidence.—*Atlas*.

PARISIAN DIAMONDS.—It may be interesting to our readers to know that these beautiful imitations of the "priceless gem," which have lately attracted so much attention, are made by a chymist in Paris, and are only the oxide of tin. It is to be regretted that the brilliancy which has rendered this imitation so famous cannot be depended upon, as, after exposure for some time, they become as dull as common glass.—*Mining Journal*.

•• Communications, Books for Review, &c. are requested to be addressed —"To the Editors of the ANNALS OF CHYMISTRY, care of Messrs. Longman, Brown, and Co. Paternoster Row."

WILSON AND OGILVY, 57, SKINNER STREET, SNOWHILL, LONDON.

THE  
ANNALS OF CHYMISTRY  
AND  
PRACTICAL PHARMACY.

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No. 7.] FRIDAY, NOVEMBER 11, 1842. [VOL. I.

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PHARMACEUTICAL BOTANY.

A CORRESPONDENT, whose name would add lustre to our ANNALS, but whose modesty prefers, for the present, the signature of HERBARIUS, has directed our attention to the neglected state of Medical Botany. The subject certainly demands the reforming aid of all who wish well to the practice of physic, or who desire pharmacy to stand on the footing of an exact science. We will, therefore, present our readers with the substance of HERBARIUS' observations, taking the liberty to intermingle with them a few of our own.

It is clear that for many years past, the study of plants, with reference to their utility in medicine, has not been cultivated with the diligence that its importance merits, nor with the zeal and precision shown by labourers in the other branches of science which bear upon the *Materia Medica*. Whatever may be the cause, the fact is indubitable. There are men enough competent to the task; but it would seem that, at the present moment, they are one and all unwilling to come forward and advance this department of knowledge. It will be allowed by every one that the subject is far, indeed, from unimportant. Many of the most active remedies afforded by the vegetable kingdom are among our native plants, and thus afford easy opportunities for the investigation which they require. Among them we must number not only those which have a place in our *Pharmacopœia*, but others, which, though of great efficacy, have fallen into undeserved disrepute.

For we may apply to medicines what HORACE says of words:—

“ *Multa renascentur quæ jam cecidère, cadentque  
Quæ nunc sunt in honore vocabula, si volet usus,  
Quem penès arbitrium est, et jus, et norma loquendi.*”

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\* *De Arte Pœt.* 70.



In short, there is a fashion in drugs as well as in costumes; old ones are revived, while others, which are the favourites of the day, will soon be forgotten. Hence, in such an investigation, plants must not be passed over, which, though just now laid on the shelf, are known to possess active properties.

Dr. WITHERING, who re-introduced foxglove into practice, tried its effects from finding it the active ingredient in a family-receipt for dropsy about which his opinion was asked.

Without this new and thorough examination of medicinal plants, how can the herb-gatherer uniformly procure them in a fit state for medical use? The prescription of the physician may, in consequence, be often little better than a charm, and the patient might as well hang it about his neck, as swallow it when prepared.

But it may be asked, "have we not excellent works on the *Materia Medica*, all of which describe the medicinal plants of this country?"

It is true that we have books on the *Materia Medica*—books which must have cost their authors infinite labour, and which show that the labour was not thrown away; yet these works, excellent as they are, must, from their very comprehensiveness, be chiefly compilations. Art is long, and life short, says the Father of physic; and what life can be sufficiently extended to allow the authors of such bulky compilations to test all the facts which they adduce? Nor shall we much mend the matter if we suppose the writer on *materia medica* to rely for his facts on botanical authorities.

Practical botany is far in the rear of chymistry and the other sciences which are ancillary to medicine. DE CANDOLLE candidly confesses that probably one-half of the known species of plants have not been described from living specimens; that hardly a quarter have been sufficiently verified; and that there is scarcely a hundredth part about which one might not reasonably doubt whether they are species or varieties\*.

Yet compilers may do more than they have done. It is their duty, not merely to look into the works of systematic botanists, who like themselves, must take much upon trust; but to read

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\* "La moitié peut-être des espèces connues n'ait pas été décrite sur le vivant; il y en ait à peine un quart sur lesquelles on ait fait les vérifications suffisantes; on en trouverait à peine un centième sur lesquelles on ne pût consacrer des doutes légitimes, quant à la question de savoir si ce sont des espèces ou des variétés."

with scrupulous fidelity the essays of those who have limited their labours to certain species of plants, and who have, consequently, bestowed far more time on these favourites than the author of an entire Flora could afford.

To improve pharmaceutical botany many labourers are wanted; and among them should certainly be some who are actively engaged in practical pharmacy; for such men know the desiderata for the cultivation of the field where they have toiled.

To those whose knowledge is original, however limited, we would again say, "contribute what you have." If half of the profession would each establish one new fact in this region of medical inquiry, how vast would be the accumulated treasure!

We return our hearty thanks to HERBARIUS for his letter, and assure him that we wait with impatience for the communication which he promises.

## CHYMISTRY, OPERATIVE AND EXPERIMENTAL.

ART. II.—*Action of Cyanide of Potassium on Metallic Oxides and Metallic Sulphurets in the Moist Way.* By M. HAIDLEN and M. R. FRESENIUS.

[Continued from page 177.]

### APPLICATION OF CYANIDE OF POTASSIUM TO QUANTITATIVE ANALYSIS.

ALL the methods which we are about to give admit of absolute separation.

1. *Zinc, from Lime, Barytes, and Strontian.*—The solution is mixed with carbonate of potassa until alkaline reaction ensues; then with cyanide of potassium in excess, and heated; the carbonated earths remain perfectly insoluble, whilst the carbonate of zinc is easily dissolved. The solution is then boiled in a small retort with muriatic acid, adding nitric acid until the prussic acid is expelled. The zinc is then precipitated with carbonate of soda, with those precautions which are to be observed when a salt of ammonia is present.

2. *Zinc from Magnesia.*—After precipitating with carbonate of potassa, a quantity of cyanide of potassium is added, sufficient for redissolving the zinc, and the mixture is evaporated to dryness, adding at the same time a further portion of carbonate of potassa whilst boiling. By treating the residue with water, magnesia remains undissolved, whilst the zinc is obtained in solution as zinco-cyanide of potassium.

3. *Zinc from Alumina*.—Cyanide of potassium is added to the solution in excess without heat. Zinc is dissolved, and hydrate of alumina remains behind.

4. *Cobalt from Manganium*.—Its separation has been explained by Professor Liebig in another place.\*

5. *Cobalt from Lime, Barytes, Strontian*.—The acidulated solution is mixed with cyanide of potassium in excess, then heated, and carbonate of potassa added; and, after boiling, the cobalto-cyanide of potassium may be removed from the carbonated alkaline earths by filtration.

6. *Cobalt from Alumina*.—The treatment to be pursued is the same as for the separation of zinc from alumina.

7. *Cobalt from Magnesia*.—The separation is managed as in the process of separating zinc from magnesia.

Professor Liebig has already stated, that cobalt may be disengaged from the cobalto-cyanide of potassium by fusion with nitre, and thus brought into a form admitting of correct estimation. The black residue of oxide of cobalt remaining after the fused mass has been treated with water, must, for the purpose of being accurately estimated, be dissolved in an acid. Cobalt, as is known, is best precipitated from a solution by caustic potassa.

8. *Cobalt from Nickel*.—For this purpose the treatise mentioned in the beginning of this article (Liebig's *Annalen*, Bd. xli. S. 285, ff.) may be consulted.

9. *Cobalt from Zinc*.—Cyanide of potassium is added to the solution until the precipitate of bichyanide of cobalt and cyanide of zinc, first produced, completely dissolves in an excess of the precipitant. The clear yellowish solution of bichyanide thus formed, is mixed with muriatic acid in excess, which produces a white precipitate of cobalto-cyanide of zinc. In the solution remains chloride of zinc undissolved, if the zinc be in excess; but if cobalt is in excess, then cobalto-cyanide of potassium. The mass is boiled until the precipitate is completely dissolved, and all the prussic acid expelled. Caustic potassa is then added, until the precipitate of cobalto-cyanide, first produced, is again dissolved; and, after heating, the zinc is precipitated by sulphuretted hydrogen. In the filtered solution cobalto-cyanide of potassium free from zinc is contained, from which the quantity of cobalt has to be defined, according to the method previously indicated.

It appears also that, by means of cyanide of potassium, nickel, zinc, and cobalt, may be separated from each other with perfect accuracy in a solution containing these three metals. The proceedings are, at commencement, exactly as just described. After the addition of the caustic potassa, the mass is boiled until the ammonia is entirely expelled, whereby a precipitate of oxide of

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\* Liebig's *Annalen*, Bd. xli. S. 285. ff.

nickel, containing zinc, is obtained; whilst there remains in the alkaline solution cobalto-cyanide of potassium, and the greater part of the zinc. The solution removed by filtration is then precipitated with sulphuretted hydrogen, by which procedure cobalt and zinc are separated. The oxide of nickel containing zinc is dissolved in acetic acid, the zinc precipitated therefrom by sulphuretted hydrogen, and the precipitate, together with the sulphuret of zinc previously obtained, brought on a filter. The oxide of nickel is precipitated from its solution in acetic acid by means of potassa.

10. *Separation of Nickel from Lime, Barytes, Strontian.*—Cyanide of potassium is added to the liquid in excess, and then carbonate of potassa, the whole heated, and the solution of nickelo-cyanide of potassium removed from the carbonated alkaline earths. The filtered liquid is boiled for some time with muriatic acid, until all the hydrocyanic acid is expelled, which proves the complete decomposition of the cyanic combinations. Chloride of nickel is present in a state of solution; if potassa is then added, and the fluid boiled until the ammonia (produced by decomposition of the cyanate of potassa) has been entirely expelled, all the nickel will be obtained as an hydrated oxide.

11. *Separation of Nickel from Magnesia.*—The proceedings for this purpose are the same as for the separation of zinc from magnesia.

12. *Separation of Nickel from Alumina.*—This is effected in the same manner as zinc from alumina.

13. *Separation of Lead from Cadmium.*—The liquid is mixed with cyanide of potassium in excess, and heated till the lead separates, whilst the cadmium is dissolved, forming cadmio-cyanide of potassium. The cadmium may be precipitated from this solution either by sulphuretted hydrogen, or, after having been boiled with muriatic acid until the whole of the hydrocyanic acid has been expelled, with carbonate of potassa. As the precipitate of lead always contains potassa, it is dissolved in nitric acid, and then precipitated by oxalate and carbonate of ammonia.

14. *Separation of Bismuth from Cadmium.*—Proceed as for the separation of lead from cadmium. The precipitate of bismuth always contains, in like manner, a portion of potassa; wherefore it must be dissolved in nitric acid, and the bismuth precipitated from the solution by carbonate of ammonia.

15. *Separation of Copper from Bismuth.*—They are separated exactly in the same manner as cadmium from bismuth. The cupro-cyanide of potassium is converted, by long boiling with muriatic acid and the addition of nitric acid, into chloride of copper, and the copper precipitated therefrom by potassa. The combinations of the before-mentioned metals with sulphur may also be perfectly separated by the solution of cyanide of potassium;

sulphuret of copper is easily and perfectly taken up, whilst the sulphuret of bismuth remains undissolved.

16. *Separation of Copper from Lead.*—The same proceedings are required to effect this arrangement as in the case of copper and bismuth. Both the methods there laid down may be likewise employed here.

17. *Separation of Copper from Cadmium.*—Cyanide of potassium is added to the liquid until the precipitates first produced are redissolved, and sulphuretted hydrogen is conducted into the solution, containing cupro-cyanide of potassium and cadmio-cyanide of potassium. Sulphuret of cadmium is completely precipitated. After the sulphuretted hydrogen, present in excess, has been removed by heating, and some more cyanide of potassium has been added, the sulphuret of copper remains perfectly dissolved.

It may be precipitated therefrom either in the same form, by addition of muriatic acid, or, which is preferable, the mass may be boiled with muriatic acid, gradually adding nitric acid until the hydrocyanic acid is completely expelled, when the precipitation is to be effected with potassa.

18. *Separation of Silver from Lead.*—Cyanide of potassium is added in excess, and then the liquid heated. The lead remains as a deposit, whilst the silver is dissolved as argento-cyanide of potassium; the cyanide of silver may be disengaged from the solution by addition of nitric acid, and weighed as such.

19. *Separation of Silver from Copper.*—Mix the solution with cyanide of potassium until the precipitate produced is redissolved, and then precipitate the silver from this solution either by sulphuretted hydrogen (during which process the copper remains completely dissolved; after the introduction of the sulphuretted hydrogen, any excess of which may be expelled by heating, some cyanide of potassium is to be added), or the solution of the two cyanides in cyanide of potassium is mixed with nitric acid in excess; the cyanide of silver is thereby completely disengaged, whilst the cyanide of copper is decomposed and dissolved by the nitric acid. The solution is boiled until all the cyanic acid is expelled, and the copper precipitated by means of potassa.

20. *Separation of Silver from Cadmium.*—Cyanide of potassium is added until the precipitate produced is redissolved, and the cyanide of silver is then precipitated by nitric acid added in excess, by which latter procedure the cyanide of cadmium is easily decomposed and dissolved. After all the cyanic acid has been expelled by boiling, it is precipitated from the solution by carbonate of potassa.

21. *Separation of Silver from Bismuth.*—In the same way as silver from lead,

Although silver is so very easily disengaged from bismuth, cadmium, and copper, some circumstances, as the presence of lead, are capable of modifying this separation. In such cases, cyanide of potassium affords an accurate and exceedingly easy means of separating the before-mentioned metals from silver.

**22. Separation of Quicksilver from Silver.**—Cyanide of potassium is an excellent means of separating these metals. Where the quicksilver exists in the form of protoxide, it must in all cases be converted into the peroxide. Cyanide of potassium is added to the solution until the precipitate produced is redissolved. In the solution there are present argento-cyanide of potassium and mercurio-cyanide of potassium. Nitric acid is then added in excess. By this means both double combinations are decomposed, all the cyanide of potassium being converted into nitrate of potassa. The insoluble cyanide of silver is precipitated, whilst the soluble cyanide of quicksilver remains in the liquor. By the introduction of sulphuretted hydrogen, it may be precipitated in the form of sulphuret of mercury.

[To be continued].

### ART. III.—*On the Preparation of Oxalic Acid.* By SCHLESINGER.

[Concluded from page 140.]

570 grammes (= 8795 grs., or 10 parts) of nitric acid, were poured over 57 grammes (= 879½ grs., or 1 part) of sugar, and instantly heated. At first the layer nearest the sugar, then the whole mass, assumed a yellow colour, which afterwards changed into dark-green. During a most vivid action the whole fluid became black-green and opaque, and the nitrous acid escaped in very dark streams. This violent action did not continue for a long time; the fluid again became olive-green, dark, and at last light-yellow.

If 26·85 grammes=414 grains of sugar, and 322·2 grammes=4973 grains of nitric acid, are left to stand at +5°=44 F., feeble action ensues; nitrous acid fumes collect over the fluid, which soon assumes a beautiful dark green transparent colour, and if heated very quickly, violent action occurs. However tumultuous the action may be, it need not be apprehended that the fluid will overflow; it may be worked without danger in a glass filled to four-fifths of its whole capacity.

From these experimental results, it would appear that the best proportions for preparing oxalic acid are 4 parts of sugar, dried at 100°=257° F., 33 parts of nitric acid, 1·38 specific gravity. The boiling mixture is then evaporated to one-sixth part of its original volume, and allowed to crystallise. The whole operation is finished in from one to two hours; and if executed in a goblet glass, no second vessel is required, and the greatest pos-

sible product of dry, beautifully crystallised oxalic acid, amounting to between 58 and 60 per cent. of the sugar employed, will be obtained.

The large quantity of nitric acid, however, renders its preparation expensive\*. It may be obtained indirectly, and likewise chemically pure, by separating the oxalic acid from oxalate of lead, according to Berzelius. In this case, however, sublimation must be resorted to. The sublimation of oxalic acid requires some attention, and can only be executed with certainty in an oil or air bath, accurately observing the temperature, and the acid which it is intended to sublime must previously have completely given out its two atoms of water. Oxalic acid prepared from oxalate of lead and potassa, as well as perfectly exsiccated oxalic acid, shows at  $130^{\circ}$  C. =  $266^{\circ}$  F., the first crystalline flush, and rises at  $150^{\circ}$  =  $302^{\circ}$  F., in beautiful needles; at  $157^{\circ}$  =  $315^{\circ}$  F. carbonic acid and carbonic oxide appear, being the products of decomposition. After sublimation, a residue remains, containing potassa. The acid prepared from sugar, and perfectly exsiccated, shows the first traces of crystallisation at  $135^{\circ}$  =  $275^{\circ}$  F., and may be heated and sublimed at a temperature of  $163^{\circ}$  =  $325^{\circ}$  F. without decomposition. At  $170^{\circ}$  =  $338^{\circ}$  F., the products of decomposition slowly escape. At  $216^{\circ}$  =  $420^{\circ}$  F., it begins slowly to boil. At  $222^{\circ}$  =  $432^{\circ}$  F., the one atom of water still contained in exsiccated oxalic acid suddenly escapes, depositing over the whole tube, on which beautiful large needles are again formed, which are fused and decomposed only at  $232^{\circ}$  =  $450^{\circ}$  F.

Pure oxalic acid is not decomposed, as supposed, by nitric acid, for when 0.4 grammes = 7.7 grains of exsiccated acid were boiled with 10.0 grammes = 154 grains of nitric acid of 1.38 specific gravity, and evaporated, the oxalic acid crystallised without assuming any colour, and sublimed without change or loss of weight,—*B. R.* xxiv., page 24-33.

[Dr. Schlesinger is in error as regards England. The only cause of oxalic acid being cheaper in sulphuric acid manufactories is, that the means (sulphuric acid) of obtaining nitric acid from nitrate of soda and nitrate of potassa is cheaper. Usually oxalic acid is prepared in England from molasses; and to render the above experiments available, the specific gravity of molasses and a solution of sugar have to be compared. Messrs. Davy, Macmurdo, and Co. have, we believe, a patent for obtaining

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\* That is to say, if nitrous acid cannot be used. Much more profitable results might be obtained if, as might be arranged in some manufactories of sulphuric acid, the oxidation of the sugar by means of nitric acid were combined with the fabrication of sulphuric acid. This is the reason why in England oxalic acid may be obtained very cheap from sulphuric acid manufactories.

oxalic acid from potato fecula, the principle of which is to convert the fecula into grape sugar by means of sulphuric acid, and then decompose the saccharine matter thus formed into oxalic acid by the usual process of nitric acid. Dr. Ure has suggested the saving of the nitrous acid fumes by condensation in a cool moist atmosphere, so as to reconvert them into nitric acid by the absorption of oxygen from the atmosphere. Neither of these suggestions has effected a sufficient saving to enable the makers to reduce the price of the acid produced.—ED. A.C.]

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ART. IV.—*On the Analysis of Oxgall, and the Characteristic Properties of its Elements.* By the Baron J. BERZELIUS.

[From the Kongl. Vet. Acad. Handl.]

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[Continued from page 143.]

WE now return to the alcoholic solution precipitated by barytes. It is mixed with distilled sulphuric acid, which ought to be previously diluted with an equal volume of water. The acid is added drop by drop, continually shaking, until it ceases to produce a precipitate. This precipitate is first sulphate of barytes, afterwards sulphate of potassa and soda, with a slight trace of sulphate of ammonia. After the liquid has become clear, a small sample is taken from it and tested with sulphuric acid, in order to ascertain if the precipitation is complete. If no further precipitate ensues, it is allowed to stand for some hours in a closed vessel, and then poured into the remaining liquid; if after the solution has been completely removed no sulphate appears deposited on the inside of the bottle, the solution is free from base.

These bases consist, independent of the barytes added, of an alkali with which the bitter component of the gall was combined, and the bases of the salts.

The sulphate salts are washed with anhydrous spirit of wine under a bell-glass, after which operation they are perfectly colourless.

After being washed with spirit of wine, the basic alkaline salts are dissolved in water, filtered from the sulphate of barytes, evaporated and separated in the ordinary way. When heated, the salt became first slightly greyish, and evolved a slight smell, similar to that of animal matters. The weight of the salt in one of my experiments, after complete ignition at a red heat, amounted to 0.91 of one per cent. of the gall, and, redissolved in water, left a trace of undissolved peroxide of iron.

The alcoholic liquid, precipitated with sulphuric acid and filtered, is mixed with a little water, then poured into a retort, into which pure, recently precipitated, washed and yet moist, carbon-



ate of lead, has been previously put. These are digested together during twenty-four hours, shaking the vessel from time to time, and the greater part of the spirit of wine is then removed by distillation. The liquid is filtered from the mixture of carbonate and sulphate of lead, the dissolved oxide of lead is removed by sulphuretted hydrogen, and, lastly, the spirit of wine is completely removed by evaporation over a water-bath.\*

The treatment of the ethereal solutions, and a concentrated syrupy liquid therein remaining, next comes under consideration.

a. The ethereal solution is distilled over the water-bath to dryness, leaving a slightly yellowish clear residue, which, after evaporation of the ether, has neither taste nor odour, and is insoluble in cold water. It is treated in the same vessel with dilute barytic water, containing more than sufficient of barytes to saturate the acids contained therein. The mixture is heated to the boiling point for some time, then lively ebullition is allowed for a few seconds, and set aside to cool. The acids unite with barytes, melt, and float on the surface whilst boiling, and sink, as the liquid cools, to the bottom.

The alkaline liquid is decanted after cooling, and reduced by evaporation to a small volume. Those portions which, during evaporation, are deposited in a semiliquid form, and which, when cold, harden into a brittle mass, are fellaie of barytes, mixed with carbonate of barytes. What remains in the solution is precipitated by carbonated alkalies, (these acids, when precipitated from the barytic solution by stronger acids, always contain barytes), then filtered, and the acids removed by precipitation. They usually consist of a mixture of choleic acid and fellaic acid, a small portion of which is combined with bilin. In order to avoid details, which the memory would scarcely retain even with much effort, and which are equally difficult to be exactly understood, I shall defer the method of treating the acid of the soluble barytic salt until after the description of fellaic acid. I will only add here, that in fresh gall it consists almost solely of a small quantity of bilifellic and bilicholeic acids dissolved in ether, and which, by employing a small quantity of ether, are decomposed into fellic acid, which dissolves into fellic acid, with a maximum of bilin, which remains undissolved.

Those parts which have been left undissolved by barytic water are treated with ether, which partly dissolves them, and leaves them partly undissolved.

The solution of ether is distilled to dryness, during which operation a yellowish residue remains, which is dissolved in

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\* The preceding paragraphs to this point should have been inserted after p. 103. That which follows is correct.

spirit of wine of 0.84, mixed with a solution of carbonate of soda, and digested therewith until the spirit of wine is removed by evaporation. The solution of soda then floats on a body semi-liquid whilst warm, but hard, brittle, yellow, and resinous, when cold, which is for a second time submitted to similar treatment. The solutions of soda were poured into the same vessel, the resinous body extracted by boiling with pure water, and this latter solution added to the solution of soda. Fatty acids, as also choleic acid, are disengaged therefrom by acids, and the former separated by ether in the manner previously narrated.

The investigation of the nature of this resinous body has caused me many fruitless experiments. I, however, persevered in considering it as a combination of one of the acids of gall with fat, and endeavoured to treat it with oil of turpentine, in order to extract the fat, leaving behind the acid. The oil, however, dissolved the whole; which, after removing the same by evaporation in the water-bath, left a residue containing turpentine, from which it could not afterwards be disengaged.

If, however, this body is dissolved in spirit of wine, mixed with dissolved hydrate of potassa, and the spirit of wine is removed by evaporation and boiling, it remains in the aqueous solution combined with potassa, and can then be precipitated by muriatic acid; it then proves to be a mixture of fellic and choleic acids, which, therefore, have been contained therein in an indifferent state. If the potassa liquid is concentrated to a certain degree by evaporation, the potassa salt separates, and the liquid potassa may then be decanted from it. This, however, readily yields a coloured acid; because these acids, when treated with alkali in excess, very easily grow yellow when exposed to heat, and finally brown. In opposition to the expression *dyslysin*, we may term this body *eulysin*, from the facility with which it is dissolved in spirit of wine.

The acids obtained in this way are treated with barytic water, the undissolved barytic salt digested with spirit of wine, the chlorate of barytes undissolved by the spirit of wine decomposed by boiling with carbonate of soda, and the acid precipitated from this soda solution by muriatic acid. By these proceedings, I extracted from the product of *eulysin* with barytic water, particularly from old gall, a considerable quantity of fellate of barytes, and, with spirit of wine, fellite of barytes, which acids, therefore, participated in a similar state of indifference as did the weaker choleic acid.

Whether these acids are contained in gall in this state, or whether they pass into this state during treatment only, I am unable to decide. I am, however, bound to add, that I was unable to reduce them to it by liquefaction caused by heat.

They retain this indifferent state so obstinately, that they are not reduced to the active state by spirit of wine mixed with water of barytes; and I kept a solution in spirit of wine mixed with ammonia, which, for more than a year, remained in this indifferent state.

$\beta$ . Those portions of the combinations of barytes which were left undissolved by the ether, are now dissolved by spirit of wine, 0.85 to 0.86 sp. gr. The substance taken up by the spirit of wine, during this operation, is fellate of barytes. The solution is precipitated by a solution of carbonate of soda, the spirit of wine evaporated; the aqueous solution is then filtered, and precipitated by muriatic acid, by which proceeding a pure and snow-white fellic acid is usually obtained.

$\gamma$ . The residue left, after treating with spirit of wine, is decomposed by hot muriatic acid, when a mass, composed of stearic and choleic acids, remains, which are separated from each other by dissolving the former in ether, in which menstruum it is readily soluble. The ether is employed several times in succession in small quantities: of these the first portion is allowed to act on the acids for some hours before it is removed; the succeeding portions do not require so much time. The undissolved choleic acid is dissolved by carbonate of soda, leaving behind a little carbonate of barytes, and then again precipitated with muriatic acid. Success is not so certain if we attempt to separate the stearic from the choleic acid by means of weak spirit.

[To be continued.]

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ART. V.—*Method of detecting Adulteration in the expressed Oils of Commerce.*

To M. Heidenreich, pharmacien of Strasburgh, it was proposed to decide, whether the adulteration of different oils could be ascertained by definite chymical tests. It then became an object of research with him to find out some method of proceeding which would enable those who are not *au fait* at chymical experiments to detect these adulterations, by furnishing some accurate characteristic test which might be employed without much trouble, or requiring nicety of manipulation; and he therefore directed his attention to the three following series of experiments:—

1. *By observing the peculiar odour evolved by each Oil when gently heated.*

For this purpose he suggests, that a few drops only of the oil under examination be exposed for some moments, in a small porcelain basin, to the flame of a spirit-lamp. The odour which

is evolved immediately suggests that of the plant or animal from which it has been obtained; and this characteristic is valuable if observed in conjunction with the genuine oil, and furnishes accurate indications of the presence of linseed and train oils in any mixture.

2. *By the action of concentrated Sulphuric Acid on Oils.*

By mixing a small quantity of concentrated sulphuric acid with some oil, (in the proportion of about 1 or 2 parts of the former to 100 parts of oil,) very intense action immediately ensues, the temperature increases, and the mixture becomes coloured.

A plate of white glass being laid over a sheet of white paper, if we place on the former from 10 to 15 drops of oil, and then add thereto one small drop of sulphuric acid of  $66^{\circ} = 1.632$ , sp. gr., a colour will soon be produced without stirring, differing according to the oil employed.

In the case of *rape oil*, there will gradually form, at a certain distance from the drop of sulphuric acid, a greenish-blue ring; whilst towards the centre, where the action is more violent, light yellow-brown streaks may be observed.

*The expressed oil of black mustard-seed* likewise assumes a tinge of bluish-green; but the quantity of oil must, in this case, be increased to 25 or 30 drops.

In *train oil*, obtained from the whale or stock-fish, a very peculiar motion occurs, commencing at the centre and extending to the outside, whilst a red colour is observed, which grows more and more vivid, until after ten or fifteen minutes, when the margin assumes a violet tinge, which, in the course of about two hours, becomes uniform throughout the mixture.

*Olive oil* instantly assumes a pale yellow colour, which afterwards becomes yellowish-green.

In *poppy oil*, and that obtained from sweet almonds, the colour approaches to that of the greenfinch, and afterwards becomes of a dead yellow hue.

In *linseed oil* a drop of acid produces a beautiful dark brownish red web, which is gradually converted into a brownish-black.

*Tallow oil* (called by the trade oleic acid) is rendered brown.

If, instead of allowing the sulphuric acid to act on the oil undisturbed, both fluids be stirred up with a glass rod after adding the drop of sulphuric acid, the phenomena mentioned appear in different order.

*Rape oil* then assumes a uniform brown colour, without a tinge of red; and if, instead of one drop of acid, five or six are added, and mixed with the oil, the whole mass becomes of a dead brown-red colour, not very intense, remaining green only on the edges.

By doubling or tripling the expressed oil of black mustard seed, the quantity tested gives rise to similar action, with the exception that the colour is somewhat less bright.

Train oil instantly assumes, when stirred, a lively brown-red colour, which finally passes into dark brown and violet, without a hue of green. If mixed with five or six drops of acid, the colour is much more intense, and the violet colour sooner appears.

Seal oil assumes a yellowish-grey colour. If, however, thirty drops of oil are taken instead of ten, a colour slightly approaching to green-blue also appears, so that one drop more changes it into grey. On the addition of five or six drops of acid, it receives a lively orange-yellow tint.

The oils from the olive, poppy, and sweet almonds, all assume a yellow colour, more or less dingy or grey; and, by the addition of more acid, the action is rendered far more violent.

If linseed oil is stirred with the rod, as before mentioned, a brownish black lump forms, and, by adding five or six drops of acid, the whole forms a resinous, black, and persistent mass. It is true that all other oils likewise become plastic by the addition of greater or smaller quantity of acid; none, however, to a similar degree, and with a colour so black, as linseed oil. The oil obtained from tallow assumes a dark dirty brown colour, which does not vary in tint by the addition of more acid.

In trade it seldom occurs that a better oil is mixed with an inferior. Oil of almonds, olives, and codfish oil, will, therefore, never be used for adulterating rape oil, but probably train, or perhaps linseed oil, and sometimes poppy oil. If we are led, therefore, by the odour to infer an adulteration—for instance, by train oil, which occurs the most frequently—it is only necessary to place from ten to fifteen drops of rape oil, the purity of which is undoubted, together with as much train oil, and an equal quantity of the oil whose purity is suspected, and to add to each of them a small drop of sulphuric acid. From the colour produced an inference may be drawn as to the purity of the oil, and by the difference of tinges from the vivid red of the train oil, and the bluish green of rape oil, the extent of adulteration may be ascertained. In this manner I detected adulterations made with half the quantity of an inferior oil; and the areometer bore further testimony to the precision of my observations.

In undertaking an experiment, the commencement of the reaction must be accurately observed, with the several oils placed beside each other; for the colours, after a quarter of an hour has elapsed, are less distinct, and the mixture should, for the purpose of attaining to greater certainty in the first experi-

ment, be left undisturbed; in a second stirred with the glass rod. It is likewise necessary to avoid employing more than one drop of the acid to ten drops of oil, since otherwise the reaction which ensues is too violent.

If the presence of linseed oil be suspected in train oil, this will be discovered, if the mass is left undisturbed, by a rather intense brownish red colour; if disturbed, by a brownish black colour. The intensity of the latter is increased by the increased addition of acid, and also the consistence of the moisture.

The adulteration by poppy oil is seldom met with in commercial rape oil, because it is commonly much dearer than the latter. In the present year, however, the reverse was the case, and rape oil was found to have been adulterated with poppy oil. In this case the colour produced is of a very slight bluish green, approaching somewhat to yellow, but sufficiently distinct to admit of an inference being drawn, as to the adulteration, with perfect certainty. In such cases the specific gravity of both oils must be received as the sole criterion for identifying them.

It has been reported that tallow oil has several times been mixed at Paris with rapeseed oil: besides the brownish colour produced by sulphuric acid, the tallowy smell, the brown colour, the acid reaction, and last, although not least, its density, which is less than any other of the fixed oils, are such decisive characteristics, that we must be blind indeed if we do not instantly discover this fraud.

[To be continued.]

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#### ART. VI.—*Means of Detecting Sugar of Starch in Cane and Beetroot Sugars.* By E. KRANTZ.

Two grammes (=33 grains) of the sugar suspected to contain starch-sugar are dissolved in 30 grammes (=about one ounce) of distilled water, filtered, and two decigrammes=3 grs. of pure caustic potassa (potasse à l'alcohol\*), together with 1 deci-

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\* Potasse à l'alcohol signifies caustic potassa purified by means of alcohol. The Parisian codex of 1837 directs the dry hydrate of potassa (lapis caust.) in the form of a coarse powder, to be digested in a glass alembic with an equal weight of 36° B. (0.844 sp. gr.) during forty-eight hours, and after decanting the solution, to treat the residue a second and third time with a like quantity of alcohol, and in the same manner. The mixed solutions, after having become perfectly clear, are reduced, by distillation from a retort, to half their volume, and then quickly evaporated by boiling in a silver basin, during which operation it assumes a dark reddish colour; whilst a blackish brown substance is disengaged at the surface, which is carefully removed, lest it should impart a colour to the potassa. The perfectly clean and concentrated

grammè (=1½ grain) of sulphate of copper added, the mixture thoroughly agitated, and the vessel, wherein it is contained, well closed.

If starch-sugar is present, a red precipitate is formed after some time, and if present in considerable quantity, the copper will be converted entirely into protoxide within twenty hours. The solution is at the commencement blue or green, then entirely loses its colour, and does not contain any further trace of copper.

Pure cane or beetroot sugar does not yield any red precipitate under the same circumstances, even after a lapse of eight days\*.

If the mixture of the two varieties consists of equal parts of each of them, the precipitation completely ensues within twenty hours. In the presence of two and a half per cent. of starch-sugar, a slight red precipitate is obtained after twenty-four hours, but the solution remains coloured after eight days have elapsed.

All these tests are to be applied at ordinary temperatures.—*Journal de Chim. Med.* ; Juillet, 1842, p. 471.

## CHYMISTRY APPLIED TO AGRICULTURE.

ART VII.—*On Manures.* By MM. BOUSSINGAULT and PAYEN.

IN a former memoir we sought to establish the comparative value of manures by the results of analysis. The practical observations which have since come under our notice seem to justify the principle on which we had based our calculations ; at least no serious objections have been raised against it ; and the kindness with which enlightened practical men received our first attempts decided us on completing the task of examining all the manures that it has been possible for us to obtain.

For the better comprehension of the remarks contained in this second paper, it will be necessary to repeat the definition which we gave of powerful manures. At the present day, this definition is equally applicable as it was formerly, and appears to be the exact expression of well-ascertained facts.

*Manure is the more valuable in proportion as the quantity of organic azotised matter is stronger, or predominates over the non-*

ley is finally evaporated in the ordinary way by boiling, into lapis causticum, and the hydrate of potassa fused in a silver crucible and decanted. It ought to be white and perfectly soluble in alcohol, and ought not to effervesce when dissolved in an acid.—*Remarks of Buchner, in his Repertory, No. 82, 1842.*

\* Buchner says that this method of testing originated with Trommer.

† A still quicker method of testing, proposed by Chevalier, is to boil the suspected sugar in a ley of kali causticum ; if no starch-sugar is present, the liquor remains colourless ; if the contrary, it becomes brown.

*azotised organic matter; and in proportion as the decomposition of quaternary substances acts gradually, and agrees with the progress of vegetation\*.*

We intend to define here the value of manures applicable to such cultivated lands as receive the benefit of preceding crops, containing residuary vegetable matters poor in azote, but rich in ternary organic substances. It may be admitted that the intelligent farmer can obtain, at a low cost, the mineral matters which enter into the composition of the soil, and thereby assure himself of the influence of manures. In order that manure spread over the ground may *alone* serve for vegetable nourishment, it would be requisite that it should contain all those elements, organic and inorganic, which, without being borrowed from the atmosphere, should be in reality assimilated during the life of the plant, and contained in the crop. In this case the manure must necessarily vary according to the nature of the ground, the climate, the season, the species of vegetable cultivated, the laying down and slope of the land; and, lastly, according to the influence of the subsoil and the residue of preceding crops. If we admitted this hypothesis, the composition of manures would become so variable and complex, that any general rule would be impossible. Scientific data would be useless, for it would be utterly impossible to reunite economically the required conditions: it is convenient, therefore, as formerly practised, to divide the substances which increase the fertility of the soil into two great classes—the inorganic compounds, which, independent of the chymical properties they procure to soils, by furnishing such mineral substances as are indispensable to the complete development of vegetables, evidently contribute to the physical qualities of the land under cultivation. Such are, the salts particularly suitable for certain plants, as gypsum (*plâtre*) for leguminous plants, and those which have an alkaline reaction, and are found in the greater number of vegetables, as lime, solutions of soda or potassa, wood ashes, &c., which generally assist vegetation on all soils. These matters, so useful to the agriculturist, are comprised under the denomination of *amendments* and *stimulants*.

We may consider either as stimulants or as manure, substances by whose assistance plants are furnished with the water necessary for their most productive development: organic remains macerated in ponds, irrigation even, (too often neglected where it might be managed), serve to attain this desirable end.

*Manures*, correctly speaking, are of organic origin; they

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\* Thus it is the azote in combination, contained in a manure which is especially useful, and the proportion of this, when ascertained, indicates the richness of the manure.



ought to supply to land the want of *gaseous or soluble aliments*, such as vegetables can assimilate.

But among these aliments, we should do wrong if we considered those as most desirable which give rise to the production of the greatest quantity of carbonic acid. It were wrong, we repeat; for these almost always abound in lands continually cultivated, whilst decomposable azotised matters, experiencing the most rapid losses, ought consequently to be more frequently rendered to the soil: it should always be our care to renew the supply of these latter, which are unceasingly being exhausted. We may, then, with propriety point out these to cultivators as most worthy of their attention; and if we determine accurately their proportion in the commonly-used manures, we shall have given useful information, and furnished the best means of detecting the frauds so prejudicial to the agriculturist, which occur in commercial manures\*.

Besides, it is now a question that has been decided by numerous concordant facts, generally admitted by the most distinguished agriculturists. They know also that certain manures furnish at one and the same time amendments—stimulants, water and organic aliments, more or less azotised; such are the majority of manures, which ought, from the many functions which they serve to fulfil, to be very appropriate to the soil, and especially for cultivation: *fresh* for dry or sandy lands; *warm* for wet and cold *argillaceous* soils.

As to rich manures, capable of being transported to long distances, they may be fruitfully applied on all lands, for all kinds of cultivation, provided that their action be assisted, and the power of the soil developed by amendments, and by irrigation, contrived on the spot, or not far removed from the farm.

To fix our ideas clearly on this subject, we cite the following example:—On a dry and sandy land, where manure, strongly impregnated with moisture, agreed very well, it was attempted to replace this manure by dry blood, of equal value. It was easy to foresee the result: the crop failed.

Ought we, from this, to conclude that a manure, rich in strongly azotised matter, was useless or injurious on a light soil? Undoubtedly not: Mixed with a small portion of fresh manure, so as to contain altogether the same quantity of azote, it rendered the vegetation far more luxurious and abundant than by the customary method of cultivation, where fresh dung alone had been employed.

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\* The numerous disputes between agriculturists and merchants, relative to disinfectant manures, and to the black residua of refineries, have shown how illusory were the old tests for manure. The proportion of azote replaces these very advantageously: it has been adopted by M. Malagutti, one of the learned Professors of the Faculty of Rennes, not far from localities where agriculture has derived much profit from the vast applications of these manures.

# ON MANURE.

TABLE OF ANALYSES AND COMPARATIVE VALUE OF MANURES.

| NAME.                                               | Normal Water. | Weight of dry matter employed. | Nitrogen in 1 bushel of material as laid, or 100 lbs. of water at 50° F. | Temperature. | Densities in the dried matter. | Nitrogen in the dried matter. | Nitrogen in the Normal matter. | TITLE.          |                                 | REMARKS.                                                                                     |
|-----------------------------------------------------|---------------|--------------------------------|--------------------------------------------------------------------------|--------------|--------------------------------|-------------------------------|--------------------------------|-----------------|---------------------------------|----------------------------------------------------------------------------------------------|
|                                                     |               |                                |                                                                          |              |                                |                               |                                | Dry substances. | Substances in the Normal state. |                                                                                              |
|                                                     |               |                                |                                                                          | F.           |                                |                               |                                | A.              | B.                              |                                                                                              |
| Farm dung .....                                     | 79.3          | 4.0756                         | 66.1                                                                     | 49°          | 0.745                          | 1.95                          | 0.4                            | 100             | 100                             |                                                                                              |
| Animal manure .....                                 | 84.90         | 0.853                          | 4.78                                                                     | 56           | 0.751                          | 1.565                         | 1.175                          | 80              | 283                             |                                                                                              |
| "    beech .....                                    | 89.3          | 0.492                          | 8                                                                        | 59           | 0.761                          | 1.906                         | 1.177                          | 77.7            | 264                             |                                                                                              |
| "    poplar .....                                   | 51.1          | 0.553                          | 5.5                                                                      | 59           | 0.761                          | 1.166                         | 0.558                          | 66              | 184                             |                                                                                              |
| "    acacia .....                                   | 53.6          | 0.373                          | 6                                                                        | 59           | 0.7516                         | 1.557                         | 0.721                          | 79.8            | 180                             |                                                                                              |
| "    pear-tree .....                                | 14.5          | 0.593                          | 6.2                                                                      | 66           | 0.745                          | 1.53                          | 1.36                           | 81.5            | 340                             |                                                                                              |
| Mania sative, recent manure.                        | 70.56         | 0.31                           | 14                                                                       | 63           | 0.745                          | 1.534                         | 0.45                           | 78.6            | 112.5                           | Roots, stalks, leaves, and flowers.                                                          |
| Branches and leaves of box ..                       | 59.26         | 0.488                          | 13.26                                                                    | 63           | 0.753                          | 2.89                          | 1.17                           | 147             | 262.5                           |                                                                                              |
| Residue from cyder apples ..                        | 6.4           | 0.716                          | 3.7                                                                      | 43           | 0.747                          | 0.63                          | 0.59                           | 32.3            | 147                             | Previously dried.                                                                            |
| "    hops .....                                     | 73.05         | 0.439                          | 6.50                                                                     | 60           | 0.749                          | 2.228                         | 0.835                          | 114             | 180                             | Hops, 1st quality.                                                                           |
| Beetroot leaves and stems ..                        | 67.0          | 0.488                          | 6.5                                                                      | 59           | 0.769                          | 1.579                         | 0.769                          | 80.9            | 134                             | Vinous, process of M. Dombasle.                                                              |
| Exhausted slices of beetroot ..                     | 94.50         | 0.691                          | 10.25                                                                    | 59           | 0.7666                         | 1.758                         | 0.009                          | 90.1            | 23                              | Ditto.                                                                                       |
| Cakes of cotton grain .....                         | 11.08         | 0.332                          | 13.26                                                                    | 72           | 0.7607                         | 4.524                         | 4.02                           | 233             | 1000                            |                                                                                              |
| "    canebrake .....                                | 6.5           | 0.668                          | 33.3                                                                     | 45           | 0.764                          | 6.98                          | 5.915                          | 304             | 1878                            |                                                                                              |
| "    hempsed .....                                  | 5.0           | 0.584                          | 24.7                                                                     | 45           | 0.753                          | 4.78                          | 4.21                           | 245             | 1653                            |                                                                                              |
| "    poppies .....                                  | 5.0           | 0.714                          | 38.2                                                                     | 44           | 0.753                          | 5.70                          | 5.36                           | 229             | 1540                            | Very woody, employed as fuel.                                                                |
| "    beech nuts .....                               | 6.2           | 0.718                          | 20.7                                                                     | 44           | 0.752                          | 5.53                          | 5.24                           | 181             | 628                             |                                                                                              |
| "    walnuts .....                                  | 6.0           | 0.719                          | 34.0                                                                     | 45           | 0.752                          | 5.59                          | 5.24                           | 286.6           | 1310                            |                                                                                              |
| Dung from huns (du snid) ..                         | 60.88         | 0.483                          | 9                                                                        | 62           | 0.745                          | 2.083                         | 0.79                           | 107             | 197                             | Communicated by M. Gasparin.                                                                 |
| Guano imported into England ..                      | 19.56         | 0.705                          | 40                                                                       | 58           | 0.766                          | 6.201                         | 4.988                          | 323             | 1247                            | Normal state.                                                                                |
| "    cleaned by sifting .....                       | 23.46         | 0.480                          | 29.50                                                                    | 60           | 0.744                          | 7.047                         | 5.898                          | 361             | 1249                            | Globuliferous concretion, removed                                                            |
| "    imported into France ..                        | 11.26         | 0.366                          | 37                                                                       | 65           | 0.746                          | 15.732                        | 18.950                         | 806.7           | 2487                            | Distinct putrid odour.                                                                       |
| Litter of silkworms (5 <sup>th</sup> age) ..        | 14.29         | 0.498                          | 15                                                                       | 61           | 0.754                          | 3.483                         | 3.283                          | 178.7           | 827                             | From Neuilly.                                                                                |
| "    (6 <sup>th</sup> age) .....                    | 11.39         | 0.861                          | 11.25                                                                    | 59           | 0.773                          | 3.709                         | 3.200                          | 190             | 822                             | Ditto.                                                                                       |
| Chrysalides .....                                   | 78.50         | 0.318                          | 25                                                                       | 64           | 0.760                          | 6.967                         | 1.943                          | 461             | 485                             | From Senart.                                                                                 |
| Urine from the public urinals ..                    | 9.57          | 0.863                          | 56                                                                       | 59           | 0.751                          | 17.556                        | 16.853                         | 906.2           | 4213                            | Dried in a stove.                                                                            |
| Ditto .....                                         | 96.889        | 0.150                          | 26                                                                       | 58           | 0.752                          | 23.108                        | 0.715                          | 1133            | 179                             | 1543 grs. of liquid gave 3.617 grs. of residue; the volatile ingredients have been reckoned. |
| Animal charcoal from the refineries (Mayenne) ..... | 27.66         | 1.038                          | 16.5                                                                     | 56           | 0.774                          | 1.901                         | 1.375                          | 97.4            | 243.7                           |                                                                                              |
| Dutch manure .....                                  | 44.12         | 0.882                          | 8                                                                        | 57           | 0.764                          | 2.478                         | 1.26                           | 127             | 340                             | Blood + lime + coal soot.                                                                    |
| English black .....                                 | 13.46         | 0.960                          | 18                                                                       | 59           | 0.751                          | 8.023                         | 6.953                          | 411.4           | 1788                            |                                                                                              |
| Residue from Pruss. blue + blood ..                 | 53.40         | 0.466                          | 11                                                                       | 66           | 0.7704                         | 2.8031                        | 1.806                          | 143.7           | 326                             |                                                                                              |
| Marine plants mineralised ..                        | 12.54         | 0.645                          | 18.5                                                                     | 66           | 0.757                          | 2.756                         | 2.408                          | 141             | 602                             | Dried in the stove.                                                                          |
| Ditto .....                                         | 11.72         | 1.008                          | 24.5                                                                     | 58           | 0.760                          | 2.714                         | 2.866                          | 139             | 596                             | Horse dung in a dry state, & previously sifted to remove the straw.                          |
| Rotten manure .....                                 | —             | 1                              | 8.7                                                                      | 46           | 0.739                          | 1.03                          | —                              | 53.8            | —                               | Previously dried.                                                                            |
| Sea shells .....                                    | —             | 2.130                          | 1.60                                                                     | 76           | 0.7685                         | 0.053                         | 0.053                          | 3.67            | 13                              |                                                                                              |

Note.—In the column A, the title of each manure, supposed dry, is compared to that of dry dung, represented by 100.—In the column B, the title of each manure, in its usual moist state, is compared with the title of moist dung, represented by 100.  
 It will be perceived, that farm dung differs chiefly from inn dung in its proportion of dry matter: the 1st contains 0.2, and the 2d 0.4 of solid matter. These data may serve to calculate the amount of profit that might be realised by drying manures, in order to reduce the cost of carriage.

## SYNOPTICAL TABLE OF EQUIVALENTS OF MANURES.

| SUBSTANCES.                           | Equivalent of the substance dry. | Equivalent of the substance in its Normal state. | OBSERVATIONS.                                        |
|---------------------------------------|----------------------------------|--------------------------------------------------|------------------------------------------------------|
| Farm dung . . . .                     | 100                              | 100                                              | Taken as a term of comparison.                       |
| Autumnal leaves, oak . .              | 125                              | 34                                               |                                                      |
| — — beech . . . .                     | 102·3                            | 33·98                                            |                                                      |
| — — poplar . . . .                    | 167·2                            | 74·34                                            |                                                      |
| — — acacia . . . .                    | 125·2                            | 55·47                                            |                                                      |
| — — pear-tree . . . .                 | 127                              | 29·40                                            |                                                      |
| Madia sativa, recent manure           | 126                              | 88·88                                            | Roots, stalks, leaves, & flowers                     |
| Box . . . .                           | 67·5                             | 34·18                                            | Branches and leaves.                                 |
| Residue of apples used for cyder }    | 309                              | 67·79                                            | Residue dried in the air, taken as the normal state. |
| Ditto hops for brewing . .            | 87·6                             | 66·65                                            | Res. containing 0·73 of water.                       |
| Scum and lees . . . .                 | 127·1                            | 74·65                                            | From a beet root sugar factory                       |
| Exhausted slices of beet-root . . . . | 110·7                            | 4136·50                                          | From beet root macerated.                            |
| Cake of cotton grains . .             | 32                               | 9·99                                             |                                                      |
| — camelina . . . .                    | 32·8                             | 7·25                                             |                                                      |
| — hempseed . . . .                    | 40·8                             | 9·50                                             |                                                      |
| — poppies . . . .                     | 34·2                             | 7·46                                             |                                                      |
| — beechnuts . . . .                   | 55                               | 12·08                                            | Very woody, used for burning                         |
| — walnuts . . . .                     | 34·8                             | 7·63                                             |                                                      |
| Inn dung . . . .                      | 93·7                             | 50·63                                            | Inland.                                              |
| Guano . . . .                         | 31·4                             | 80·40                                            | Imported into England.                               |
| Ditto . . . .                         | 27·7                             | 74·10                                            | Ditto sifted.                                        |
| Ditto . . . .                         | 12·4                             | 28·60                                            | Imported into France.                                |
| Litter of silk worms . .              | 56                               | 12·17                                            | 5 <sup>e</sup> age.                                  |
| Ditto . . . .                         | 52·5                             | 12·15                                            | 6 <sup>e</sup> age.                                  |
| Chrysalides of silk worms             | 21·6                             | 20·61                                            |                                                      |
| Urine . . . .                         | 11·1                             | 2·37                                             | From public urinals (dried).                         |
| Ditto . . . .                         | 8·4                              | 55·95                                            | Liquid (ammonia included).                           |
| Refineries' black . . . .             | 102·5                            | 27·91                                            | From Mayenne, obtained at Paris.                     |
| Compost (termed) Dutch                | 78·6                             | 29·40                                            | At Lyons, animalised black.                          |
| English black . . . .                 | 24·3                             | 5·75                                             | Blood + lime + coal soot.                            |
| Residue of Prussian blue              | 6·9                              | 30·62                                            | Animalised with blood.                               |
| Marine plants . . . .                 | 7·0                              | 16·61                                            | Ditto with fecal matter,                             |
| Ditto . . . .                         | 7·1                              | 16·70                                            | Ditto.                                               |
| Decomposed manure . . .               | 189                              | 33·33                                            | Horse dung, dried and sifted.                        |
| Sea shells . . . .                    | 3750                             | 769·23                                           | From the shores of Dunkirk.                          |

*Note.*—The figures in the first column indicate the quantity of each manure which would be required to replace 100 of dry dung. The figures in the second column indicate the quantity of manure which would be required to replace 100 of fresh dung (moist).

Comptes Rendus, Oct. 1842.

[Those of our readers who feel interested in agricultural matters are referred to the extract from Turner's Chymistry at page 221, where may be perused a succinct account of the advantages to be derived from the application of chymistry to agriculture.—ED.]

ART. VIII.—*The Second Supplement; completing the Seventh Edition of Dr. Turner's Chymistry.* By J. LIEBIG, Ph.D., and WILLIAM GREGORY, M.D. Taylor and Walton. Pp. 165.

THE object of the work concluded in the present supplement is to afford to the *student* a compendious view of the actual state and progress of chymical science; and this has been effected by the English editor, after considerable labour, in a manner which deserves the highest commendation. As a text-book for the professor of chymistry, it is invaluable; and we recommend it to the general reader as a most comprehensive book of reference. The new views of chymistry, as developed by the hypotheses, which divert if they do not instruct, are here clearly explained; but if the work be purchased by the druggist with a view to obtain therefrom practical information, its possessors will be disappointed. It may be described as a concise narration of the advances made by scientific chymists, unaccompanied by the details of those processes which have led to the results given; and we do not state this as a fault of the editor, who, together with the publishers, is probably impressed with the supposition, that the chymical world have too fastidious a taste at present to feel any interest either in the minutiae of processes, or desire to be put in possession of the names of those intellectual men who have toiled so many days—nay, years—in perfecting them, and which details, in the work before us, are compressed into, perhaps, one-fifth of the space required for their full development. Dr. Gregory has not, however, performed his task either hurriedly or carelessly, as the following able epitome of Agricultural Chymistry will testify:—

“ Every plant requires certain mineral substances, without which it cannot prosper; and a soil is fertile or barren for any given plant, according as it contains these. Thus, the ashes of wheat-straw contain much silica and potash, while the ashes of the seeds contain phosphate of ammonia and magnesia. Hence, if a soil be deficient in any one of these, it will not yield wheat. On the other hand, a good crop of wheat will exhaust the soil of these substances, and it will not yield a second crop till they have been restored, either by manure or by the gradual action of the weather in disintegrating the subsoil. Hence the benefit derived from fallows and from the rotation of crops.

“ When, by an extraordinary supply of any one mineral ingredient, or of ammonia, a large crop has been obtained, it is not to be expected that a repetition of the same individual manure next year will produce the same effect. It must be remembered, that the unusual crop has exhausted the soil probably of all the other mineral ingredients, and that they also must be restored before a second crop can be obtained.

“ The salt most essential to the growth of the potato is the double phosphate of ammonia and magnesia; that chiefly required for hay is phosphate of lime; while for almost all plants potash and ammonia are highly beneficial.

“ From the principles above mentioned we may deduce a few valuable conclusions in regard to the chymistry of agriculture. First, by examining the ashes of a thriving plant, we discover the mineral ingredients which must exist in a soil to render it fertile for that plant. Secondly, by examining a soil, we can say at once whether it is fertile in regard to any plants the ashes of which have been examined. Thirdly, when we know the defects of a soil, the deficient matters may be easily obtained and added to it, unmixed with such as are not required. Fourthly, the straw, leaves, &c. of any plant must be the best manure for that plant, since every vegetable extracts

from the soil such matters alone as are essential to it. This important principle has been amply verified by the success attending the use of wheat-straw or its ashes as manure for wheat, and of the clippings of the vines as manure for the vineyard. Where these are used, no other manure is required. Fifthly, in the rotation of crops, those should be made to follow which require different minerals; or a crop which extracts little or no mineral matter, such as peas, should come after one which exhausts the soil of its phosphates and potash.

"Of the chymical manures now so much used, *bone-dust* supplies the phosphates which have been extracted by successive crops of grass and corn, the whole of the bones of the cattle fed on these crops having been derived from the soil; its gelatine also yields ammonia by putrefaction. *Guano* acts as a source of ammonia, containing much oxalate and urate of ammonia with some phosphates. *Night-soil* and *wine*, especially the latter, are most valuable for the ammonia they yield, as well as for phosphates and potash; but are very much neglected in this country, although their importance is fully appreciated in Belgium and China. *Bran* is a very valuable manure, especially for potatoes, as it contains much of the ammoniaco-magnesian phosphate.

*Nitrate of Soda* probably acts by its alkali replacing potash, but it is possible that its acid may also yield nitrogen to plants, although we possess at present no evidence of this, and, indeed, no evidence that plants can derive their nitrogen from any other source than from ammonia."

Whilst we admire the talent of the author, we regret the limits which have been set to his powers: still more do we regret the narrow views which have induced the publishers to abridge instead of amplifying the MS. of Professor Liebig; thereby compelling the practical man to have recourse to a continental edition for the details which are to him absolutely necessary, and for which he will seek in vain in the 1274 pages now offered for his perusal.

#### ATR. IX.—*Production of Fat.* By MM. DUMAS and PAYEN.

At the meeting of the Academy of Sciences, at Paris, on the 24th of October, M. Dumas stated, in the name of himself and colleague, M. Payen, the result of some experiments which had induced them to infer that animals derive their fat from plants, or from the nutriment on which they are fed, in opposition to the views of Professor Liebig, as expressed in the preface of his work on the Organic Chymistry of Physiology and Pathology, p. 16, English edition. "How clear are now to us the relations of the different articles of food to the objects which they serve in the body, since organic chymistry has applied to their investigation her *quantitative method* of research! When a lean goose, weighing four pounds, (4·410) gains, in thirty-six days, during which it has been fed with twenty-four (six) pounds of maize, five pounds (5·512) in weight, and yields three pounds and a half (3·858) of pure fat, this fat cannot have been contained in the food ready formed, because maize does not contain the thousandth part of its weight of fat, or of any substance resembling fat."

The authority of M. Liebig is so high, that I ought to state here, M. Payen and myself had for some time been engaged in calculating the fattening power of maize. Agriculturists have

known for some time that a bushel of maize, weighing from twenty-two to twenty-four pounds, furnishes two pounds of oil.

Accurate experiments have informed us that maize contains, in truth, nine per cent. of a yellow oil, 100 grammes = three ounces and a half, which I have now the honour to lay before the Academy: so that, in eating twenty-six pounds of maize, a goose receives 2·34 pounds of fatty matter. It is not astonishing, therefore, that the animal should furnish 3·858 pounds, when we reckon that which it contained originally. Hay contains, in the state usually furnished to cattle, about 2 per cent. of fatty matter.

Our experiments prove, that cattle, whilst fattening, and milch-cows, always contain less fat than the elements which they have consumed. With respect to the latter, however, the butter represents very nearly the proportion of fatty principle contained in the food of the cow; at least, so far as those elements are concerned which we have at present studied.

Agricultural observations and chymical analyses agree in proving that the milch-cow is the most accurate and most economical means of extracting the azotized and fatty matters which are contained in pasturages.—*Comptes Rend.* Oct. 24, 1842

## PRACTICAL PHARMACY.

### ART. X.—*On Mastic, and the Gathering thereof at Chios.*

[From a Letter from Chios, communicated by X. LANDERER, of Athens.]

ALTHOUGH Greece may be called the native land of the mastic tree, *Pistacia lentiscus*, *Ελίνος*, only the southern part of Chios seems, by its climate and soil, to favour the culture and the thriving of this tree; and although, during a residence of eight years, I tried many times, by making incisions in the bark of the pistacia of Pentelikon, and at the foot of the Hymettus, I never observed any exudation of mastic therefrom; for which reason I should consider mastic as indigenous to modern Greece.

Neither is the isle of Chios, throughout its extent, appropriate for the culture of the mastic, but only twenty-four villages situated in the southern part of this happy island, and which, for this reason, bear also the name mastic villages, *Μαστιχώχρα*.

The trees, which have been purposely transplanted to the islands nearest to Chios, do not furnish any mastic. On Chios itself these plantations are found in two different kinds of soil: the one very light, argillaceous and white; whilst the other contains iron, and is of a red colour. The proceeds of the mastic gathering are, as is well known, destined as a present to the Sultana; and these plantations were neglected for several years, until a firman was issued, fixing both the quality and the quantity of mastic to be furnished annually to the Sultan, under penalty of death.

The culture of the mastic tree is limited to the care of annually digging round about the tree, cutting out, and carefully separating the dry branches ; besides this, a too close approximation of the trees lessens the product of mastic : each tree requires sufficient space, so that its branches may not touch those of another : one tree requiring a space of about eight feet in diameter.

These mastic trees only attain the height of from four to six feet ; because all sprouting branches are carefully cut off. One tree, however, will furnish, in good seasons, about forty pounds of mastic.

In order to prevent the mastic which falls off spontaneously from being rendered impure by earthy substances, the soil is kept, for several feet round about the tree, free from herbs, is levelled, and then covered with a cement of lime and clay, and, when thoroughly dry, is rendered perfectly smooth. During the month of July the operation of making incisions in the bark is commenced ; and this is executed by a fine sharp iron instrument. On the larger and vigorous branches these incisions are made at a distance of from six to eight inches from each other ; on the smaller ones at a distance of from twelve to fourteen inches. A few days after these incisions have been executed, the exudation commences, drying in the course of three or four months, when, towards the end of October or November, they are separated from the branches by the hand, or beaten off with sticks, and gathered up, together with those thrown down by the wind. Care is taken at the same time to sort them into three different qualities. The exudations, which may be described as being pure, white, small, and round, are the most esteemed ; the first quality is of six times the value of the last, which mostly consists of the grains which have been gathered from the ground.

At the termination of the harvest, the peasants of the mastic villages repair in procession with music and singing, accompanied by their wives and children, in state array, and with elegant head-dresses, to the town where the Cadi sent to Chios awaits their arrival at this period of the year for the purpose of receiving the mastic, according to the quantity and quality fixed by the firman. If the harvest has been plentiful, they are obliged to deliver the surplus to this representative, for which they are paid at a price also fixed by the Sublime Porte : in the event of a deficit, they are bound to purchase the deficiency at any price, and thus to complete the prescribed quantity without having the power of obtaining any compensation.

The inhabitants of the mastic villages enjoy, on the other hand, several privileges which the Sublime Porte has granted to them, and confirmed by firmans. Thus, for instance, they do not pay any poll-tax ; and in lawsuit, or other litigation, they have the right of addressing themselves directly to the Turkish

civil functionary, who has the title of Sakisiminys, which signifies Aga. of the mastic villages, who then acts as a mediator between the accused, and the resident Pasha.

During the mastic harvest, the people from the adjacent towns of the island, flock together in order to enjoy the spectacle of the exuding mastic, which covers the trees, resembling most beautiful and brilliant pearls, and which glitters in the sun with all the beauteous colours of the rainbow. Besides this inducement, many go in order to enjoy the air, impregnated with the fragrance of the mastic, and which is said to be of the greatest service to persons suffering from asthma, or other pulmonary complaints.

The use of mastic is confined to chewing, which, besides strengthening the gums and imparting a perfume to the breath, is considered as capable of promoting digestion; which may be easily accounted for, from the increased secretion of saliva caused by chewing. Another very agreeable stomachic, an *electuarium mastichis*, is prepared with sugar and mastic. For this purpose, purified syrup is condensed by boiling to a proper consistence, and after adding from two to three drachms of very fine and beautiful white mastic to each pound of syrup, the mass is allowed to cool, during which time it is well stirred, when it becomes white and very frothy. A liquor is likewise prepared from the gum, by distilling it with sweet fruit, together with a vinous spirit obtained from the cedar.

Since mastic is always very high-priced, and the habit of chewing it so very general, almost the whole of the mastic imported into Constantinople being consumed for this purpose, poor people use instead thereof several succedanea, namely, the gummy resinous exudations of several other plants—for instance, Cactus Opuntia, Astragalus, Gummifera, and others; and this, substituted for mastic, is termed at Constantinople *Tshekel Sakti*.—B. R.

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ART. XI.—*On the Preparation of Iodide of Potassium; being a Digest of the Treatise on the above Preparation, which gained the Prize of the Hagen Bucholzian Foundation.* By OTTO EDER.

[Continued from page 187.]

It was found, by calculation, that 3 drachms 44 grains of iodide of potassium were still contained therein. The whole produce of iodide, therefore, amounted to 5 ounces, 1 drachm, 3 grains; which, by calculating the ingredients employed, would cost about two shillings.

|                                                | s. | d. |
|------------------------------------------------|----|----|
| 4 oz. of Iodine . . . . .                      | 1  | 8  |
| 2 oz. 3 drms. 24 grs. of Potassæ Carb. e Tart. | 0  | 1  |
| Aqua distillatæ . . . . .                      | 0  | 2  |
| 2 oz. of Iron filings . . . . .                | 0  | 1  |



and the price of one pound of iodide of potassium prepared in this way, independent of time, fuel, &c. would amount to about six shillings and threepence.

2. *Preparation by means of Iodide of Zinc.*—The method of preparing the iodide of potassium with iodide of zinc is quite analogous to that with iodide of iron. Although, on the whole, the results are obtained by a similar process as the former, yet there occur several inconveniences which are unavoidable.

One ounce of iodine, and half an ounce of zinc (which latter is more than a sufficient proportion for the former) were mixed with three ounces of water. Very rapid re-action ensued, and the liquid assumed a very dark brown colour. In order, however, to effect complete decoloration of the solution, it was continually heated, gradually increasing the temperature, until at last the liquid arrived at the boiling point. For this reason it is better to effect the combination in a retort provided with a long neck, in order to avoid loss of iodine.

The solution of iodide of zinc thus obtained was colourless, had a feebly acid re-action, and disengaged some yellowish flakes, which were removed by filtering. The filtered liquor, after being diluted with twenty ounces of distilled water, was mixed with carbonate of potassa until no further precipitation ensued, during which operation it was, however, impossible to avoid adding a slight excess of carbonate of potassa. The precipitated carbonate of oxide of zinc was collected on a filter and repeatedly washed, until the washings were no longer rendered turbid by a solution of silver, for which purpose thirty-eight ounces of water were sufficient;—a result different from the indications afforded by the experiment of M. Herrmann, who states, that the carbonate of oxide of zinc thus obtained cannot be completely freed from iodine by washing\*. At the same time it should, however, be mentioned, that the possibility of cleaning it perfectly by washing is confirmed by Wendt.

When the solution of iodide of potassium had been evaporated to dryness, the alkaline residue was treated with alcohol, whereby ten drachms of iodide of potassium were obtained. One ounce of iodine was then treated with zinc, as before stated, and the iodide of zinc thus obtained was decomposed by carbonate of potassa. The precipitate produced was collected, agreeably to the suggestion of Wendt, on a tight strainer, and strongly compressed, the residue again stirred up with water, and this treatment again repeated; finally, the carbonate of oxide of zinc was washed on a filter until it was rendered perfectly pure. After evaporating the solution, and subsequent crystallization, 9 drachms 25 grains of pure iodide of potassium were obtained.

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\* Pharm. Cent. Bl. 1832, p. 352.

This process of washing the precipitate of oxide of zinc does not yield any advantage whatever, since the expense of distilled water and value of time employed is equally great as when the mass is first collected on a filter, and then washed; independent of which a still less proportion of iodine of potassium was obtained, which, notwithstanding every precaution, will sometimes occur when this manner of washing is adopted.

A third experiment, when hot water was employed for cleansing, did not yield any better result; nor did it accelerate the process. Four ounces of iodine, two ounces of zinc, and sixteen ounces of distilled water, were now brought together in a retort. After reaction had ceased, and the liquor entirely lost its colour, there remained some slight turbidity, owing to the presence of yellowish flakes. These were removed by filtration from the remaining zinc; then washed, and closely examined. They did not indicate the presence of any iodine; but every reaction pointed to oxide of iron. The clear solution of iodide of zinc was diluted with twenty ounces of water, and decomposed by two ounces and three drachms and a half of carbonate of potassa. The precipitate thus obtained was then immediately collected on a filter, and washed by means of the before-mentioned apparatus. Ninety-six ounces of water were sufficient for this purpose; thus giving, by this process, the consumption of 121 ounces of water altogether.

The solution of iodide of potassium thus obtained was evaporated and set aside for crystallization, when it yielded two ounces three drachms of a perfectly neutral salt. It is true that the residuary mother-water gave a feeble alkaline re-action. After, however, the contents of pure salt contained therein had been ascertained, a product of five ounces two scruples of iodide of potassium was the result, which, according to an accurate calculation of the materials used, amounted to 2s. Thus—

|                                             | s.    | d. |
|---------------------------------------------|-------|----|
| 4 oz. of Iodine . . . . .                   | 1     | 8  |
| 2 oz. of Pure Zinc . . . . .                | 0     | 1  |
| Distilled Water . . . . .                   | 0     | 2  |
| 2 oz. 3½ drams Pure Carb. Potassa . . . . . | 0     | 1  |
|                                             | <hr/> |    |
|                                             | 2     | 0  |
| Less pure Oxide of Zinc . . . . .           | 0     | 0  |

so that the price of one pound of iodide of potassium prepared in this way would amount to about 6s. 3d. exclusive of labour. By this method nine drachms forty-eight grains of pure oxide of zinc were afterwards obtained on purifying the precipitated zinc by exposure to a red heat, which should also be taken into account, and would slightly modify the price of the iodide of potassium.

[To be continued.]

| NOMINA.                                 | FORMULÆ.                                                                    |
|-----------------------------------------|-----------------------------------------------------------------------------|
| <i>Aqua.</i> . . . . .                  | $9\dot{\text{H}}_2$ . . . . .                                               |
|                                         | $10\dot{\text{H}}_2$ . . . . .                                              |
|                                         | $12\dot{\text{H}}_2$ . . . . .                                              |
| <i>Argentum.</i> . . . . .              | $\text{Ag}$ . . . . .                                                       |
| <i>Arsenias Aluminicus.</i> . . . .     | $\ddot{\text{Al}}_2 \cdot \ddot{\text{As}}_2$ . . . .                       |
|                                         | $\frac{1}{2}$ . . . . .                                                     |
| — Ammonicus . . . . .                   | $2\text{N}_2 \cdot \text{H}_2 \cdot \ddot{\text{As}}_2$ . .                 |
| — — cum aqua. . . . .                   | $2\text{N}_2 \cdot \text{H}_2 \cdot \ddot{\text{As}}_2 + 3\dot{\text{H}}_2$ |
| <i>bi Arsenias Ammonicus</i> . . . .    | $\text{N}_2 \cdot \text{H}_2 \cdot \ddot{\text{As}}_2$ . .                  |
| — — — cum aqua. . . . .                 | $\text{N}_2 \cdot \text{H}_2 \cdot \ddot{\text{As}}_2 + 3\dot{\text{H}}_2$  |
| <i>Arsenias Argenticus.</i> . . . .     | $\dot{\text{Ag}} \cdot \ddot{\text{As}}_2$ . . . .                          |
| — Baryticus. . . . .                    | $\ddot{\text{Ba}} \cdot \ddot{\text{As}}_2$ . . . .                         |
| — — cum aqua. . . . .                   | $\ddot{\text{Ba}} \cdot \ddot{\text{As}}_2 + 4\dot{\text{H}}_2$ . .         |
| <i>bi Arsenias Baryticus.</i> . . . .   | $\ddot{\text{Ba}} \cdot \ddot{\text{As}}_2$ . . . .                         |
| <i>Arsenias sesqui Baryticus.</i> . . . | $\ddot{\text{Ba}} \cdot \ddot{\text{As}}_2$ . . . .                         |
| — super Baryticus . . . . .             | $\ddot{\text{Ba}} \cdot \ddot{\text{As}}_2$ . . . .                         |
|                                         | $\frac{1}{2}$ . . . . .                                                     |
| — Bismuthicus. . . . .                  | $\ddot{\text{Bi}} \cdot \ddot{\text{As}}_2$ . . . .                         |
| — Cadmicus. . . . .                     | $\ddot{\text{Cd}} \cdot \ddot{\text{As}}_2$ . . . .                         |
| — Calcicus. . . . .                     | $\ddot{\text{Ca}} \cdot \ddot{\text{As}}_2$ . . . .                         |
| — — cum aqua. . . . .                   | $\ddot{\text{Ca}} \cdot \ddot{\text{As}}_2 + 4\dot{\text{H}}_2$ . .         |
|                                         | $\ddot{\text{Ca}} \cdot \ddot{\text{As}}_2 + 6\dot{\text{H}}_2$ . .         |
| <i>bi Arsenias Calcicus.</i> . . . .    | $\ddot{\text{Ca}} \cdot \ddot{\text{As}}_2$ . . . .                         |
| <i>Arsenias sesqui Calcicus.</i> . . .  | $\ddot{\text{Ca}} \cdot \ddot{\text{As}}_2$ . . . .                         |
| — Cericus. . . . .                      | $\ddot{\text{Ce}} \cdot \ddot{\text{As}}_2$ . . . .                         |
|                                         | $\frac{1}{2}$ . . . . .                                                     |
| — Cerosus. . . . .                      | $\ddot{\text{Ce}} \cdot \ddot{\text{As}}_2$ . . . .                         |

| PONDERA ATOMORUM. |                    | PARTES CENTESIMALES. |       |                      |
|-------------------|--------------------|----------------------|-------|----------------------|
| O = 100           | H <sub>2</sub> = 1 | + E                  | — E   | H vel H <sub>2</sub> |
| 1012,32           | 81,12              |                      |       |                      |
| 1124,80           | 90,18              |                      |       |                      |
| 1349,75           | 108,16             |                      |       |                      |
| 1351,61           | 108,30             |                      |       |                      |
| 5604,92           | 449,13             | 22,92                | 77,08 |                      |
| 1868,31           | 149,71             |                      |       |                      |
| 2093,99           | 167,79             | 31,23                | 68,77 |                      |
| 2431,43           | 194,83             | 26,89                | 59,23 | 13,89                |
| 1767,04           | 141,59             | 18,50                | 81,50 |                      |
| 2104,48           | 168,63             | 15,54                | 68,43 | 16,03                |
| 4343,30           | 348,03             | 66,84                | 33,16 |                      |
| 3353,84           | 268,75             | 57,06                | 42,94 |                      |
| 3803,76           | 304,80             | 50,31                | 37,86 | 11,83                |
| 2396,96           | 192,07             | 39,92                | 60,08 |                      |
| 4310,72           | 345,42             | 66,59                | 33,41 |                      |
| 7664,57           | 614,17             | 62,42                | 37,58 |                      |
| 3832,28           | 307,08             |                      |       |                      |
| 3413,92           | 273,56             | 57,82                | 42,18 |                      |
| 3033,62           | 243,09             | 52,53                | 47,47 |                      |
| 2152,12           | 172,45             | 33,09                | 66,91 |                      |
| 2602,04           | 208,50             | 27,37                | 55,34 | 17,29                |
| 2827,00           | 226,53             | 25,19                | 50,94 | 23,87                |
| 1796,10           | 143,92             | 19,82                | 80,18 |                      |
| 2508,14           | 200,98             | 42,58                | 57,42 |                      |
| 7219,04           | 578,47             | 40,16                | 59,85 |                      |
| 2406,35           | 192,82             |                      |       |                      |
| 2789,48           | 223,52             | 48,37                | 51,63 |                      |

| NOMINA.                            | FORMULE.                                                                               |
|------------------------------------|----------------------------------------------------------------------------------------|
| <i>Arsenias</i> Chromicus. . . . . | $\text{Cr}_2^4 \text{As}_2^3$ . . . . .                                                |
| — Cobalticus. . . . .              | $\frac{1}{3}$ . . . . .                                                                |
| — sesqui Cobalticus. . . . .       | $\text{Co}^3 \text{As}_2$ . . . . .                                                    |
| — — — c. a. . . . .                | $\text{Co}^3 \text{As}_2 + 6\text{H}_2$ . . . . .                                      |
| — super Cobalticus. c. a. . . . .  | $\text{Co}^3 \text{As}_2 + 5\text{H}_2$ . . . . .                                      |
| — Cupricus. . . . .                | $\text{Cu}^2 \text{As}_2$ . . . . .                                                    |
| — bi Cupricus. . . . .             | $\text{Cu}^4 \text{As}_2$ . . . . .                                                    |
| — — — c. a. . . . .                | $\text{Cu}^4 \text{As}_2 + 4\text{H}_2$ . . . . .                                      |
| — Cuprosus. . . . .                | $\text{Cu}_2^2 \text{As}_2$ . . . . .                                                  |
| — Ferricus. . . . .                | $\text{Fe}_2^4 \text{As}_2^3$ . . . . .                                                |
| — — — cum aqua. . . . .            | $\frac{1}{3}$ . . . . .                                                                |
| — sesqui Ferricus. . . . .         | $\text{Fe}_2^4 \text{As}_2^3 + 12\text{H}_2$ . . . . .                                 |
| — super Ferricus. c. a. . . . .    | $\text{Fe}_2^4 \text{As}_2^3$ . . . . .                                                |
| — — — c. a. . . . .                | $\text{Fe}_2^4 \text{As}_2^3 + 75\text{H}_2$ . . . . .                                 |
| — Ferroso sesqui Ferric . . . . .  | $\text{Fe}^3 \text{As}_2 + 2\text{Fe}^2 \text{As}_2$ . . . . .                         |
| — — — c. a. . . . .                | $\text{Fe}^4 \text{As}_2 + 2\text{Fe}^2 \text{As}_2 + 12\text{H}_2$ . . . . .          |
| — sesqui Ferroso bi Ferr. . . . .  | $\text{Fe}^3 \text{As}_2 + \text{Fe}_2^4 \text{As}_2^3$ . . . . .                      |
| — — — c. a. . . . .                | $4(\text{Fe}^3 \text{As}_2) + 3(\text{Fe}_2^4 \text{As}_2^3) + 72\text{H}_2$ . . . . . |
| — Ferrosus. . . . .                | $\text{Fe}^2 \text{As}_2$ . . . . .                                                    |
| — Glucinius. . . . .               | $\text{G}_2^4 \text{As}_2^3$ . . . . .                                                 |
|                                    | $\frac{1}{3}$ . . . . .                                                                |

| PONDERA ATOMORUM. |                    | PARTES CENTESIMALES.   |                 |                      |
|-------------------|--------------------|------------------------|-----------------|----------------------|
| O = 100           | H <sub>2</sub> = 1 | + E                    | — E             | H vel H <sub>2</sub> |
| 6327,51           | 507,03             | 81,72                  | 68,28           |                      |
| 2109,17           | 169,01             |                        |                 |                      |
| 2378,07           | 190,56             | 39,44                  | 60,56           |                      |
| 2847,06           | 228,14             | 49,42                  | 50,58           |                      |
| 3521,94           | 282,22             | 39,95                  | 40,89           | 19,16                |
| 4347,44           | 348,36             | 53,94                  | 33,12           | 12,94                |
| 2431,47           | 194,84             | 40,77                  | 59,23           |                      |
| 3422,86           | 274,28             | 57,93                  | 42,07           |                      |
| 3872,78           | 310,23             | 51,20                  | 37,18           | 11,62                |
| 3222,86           | 258,25             | 55,32                  | 44,68           |                      |
| 6277,07           | 502,99             | 31,17                  | 68,83           |                      |
| 2092,36           | 167,66             |                        |                 |                      |
| 7626,83           | 611,14             | 25,66                  | 56,04           | 17,70                |
| 2418,49           | 193,80             | 40,45                  | 59,55           |                      |
| 61676,68          | 4942,20            | 79,32                  | 7,00            | 13,68                |
|                   |                    | Fe                     | Fe <sub>2</sub> | As <sub>2</sub>      |
| 7155,48           | 573,37             | 12,27                  | 27,35           | 60,38                |
|                   |                    | F=10,33                | As <sub>2</sub> | H <sub>2</sub>       |
| 8505,23           | 681,53             | Fe <sub>2</sub> =23,01 | 50,79           | 15,87                |
|                   |                    | Fe                     | Fe <sub>2</sub> | As <sub>2</sub>      |
| 10991,59          | 880,76             | 11,99                  | 35,60           | 54,41                |
|                   |                    | Fe=12,04               | As <sub>2</sub> | H <sub>2</sub>       |
| 43831,02          | 3512,22            | Fe <sub>2</sub> =26,81 | 42,66           | 18,49                |
| 2318,49           | 183,79             | 37,89                  | 62,11           |                      |
| 6245,29           | 500,44             | 30,82                  | 69,18           |                      |
| 2081,77           | 166,81             |                        |                 |                      |

ART. XII.—*On Adulterations of Opium.*

AN Arminian, who arrived here from Syria some time ago, and who had directed his attention for many years to the poppy plantations, as also the methods of procuring opium, told me, that the adulteration of opium most frequently met with, was that effected by mixing the opium, whilst fresh and soft, with finely-bruised grapes from which the stones have been removed. He assured me that not a single mass of opium is exported from the East without having undergone this adulteration.

Another adulteration consists in bruising the exterior skin of the capsule and stalks of the poppy, together with the white of eggs, in a stone mortar, and then adding this mixture in certain proportions to the opium.—*B. R.*

ART. XIII.—*Pocket Formulary.* By H. BEASLEY. Second Edition, pp. 284. Sherwood, Gilbert, and Piper.

EXTREMELY useful as an adjunct to the *shop-library*—a pocket-Pharmacopœia Universalis, containing, in addition to the officinal formulæ, those magistral preparations which are so continually required at the hands of the dispenser. We have been at the pains to collate some of the less usual formulæ with those of more standard works, and have been thereby induced to think well of its accuracy.

ART. XIV.—*A Toxicological Chart, exhibiting at one view the Symptoms, Treatment, and Modes of detecting the various Poisons, &c. &c.* By WILLIAM STONE, M.R.C.S. Ninth Edition. S. Highley.

EVERY prudent, not to say humane, druggist should have this chart affixed to that department of his dispensary where poisons are kept; and, indeed, could we influence Sir James Graham with his forthcoming Bill of Medical Reform, we would compel every man who profits by the sale of a poison to undergo an examination as to the remedial course to be pursued in the event of such articles having been administered. We have reasons for supposing that Dr. Christison's able work on Poisons is not so well known to some gentlemen who profit by these articles as it should be; and the price of the Table we now recommend removes every excuse for not being prepared to assist in a case of emergency.

\*.\* *Communications, Books for Review, &c. are requested to be addressed*  
—“To the Editors of the ANNALS OF CHEMISTRY, care of Messrs. Longman, Brown, and Co. Paternoster Row.”

WILSON AND OGILVY, 57, SKINNER STREET, SHOWERILL, LONDON.

THE  
ANNALS OF CHYMISTRY  
AND  
PRACTICAL PHARMACY.

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No. 8.]      FRIDAY, NOVEMBER 18, 1842.      [VOL. I.

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ON PHARMACEUTICAL CHYMISTRY.

THE English student, who seeks instruction in pharmaceutical chymistry, may search the medical literature of his country in vain for a good text-book to direct his pursuits. No friendly pilot stands there to steer his course over the troubled ocean of his doubts, or to point out the rocks and shoals on which his hopes may be wrecked. To speak less figuratively, there is no guide to clear up the difficulties, either theoretical or practical, which beset his path. The press, that fourth and noblest estate of modern society, which supplies every want, and responds to the feeblest cry for assistance, has not yet given us such a work; a certain proof that the pharmaceutical branch of the medical profession has hitherto not expressed its desire for such a book; but by no means a proof that the monitor is not substantially required.

Since such a book, however, does not exist, it may naturally be asked, where are the living guides to supply the place of printed ones? Where are our schools of pharmacy? Truth compels us to reply, "there are none." Yet many English druggists are distinguished for character and station; but they have been self-educated, and have been driven to an examination of the principles on which their art is founded, by an earnest desire to comprehend the phenomena which continually arise before them. When we say that no such work exists, we mean, of course, no work drawn up with the minuteness and the details necessary for the business of every-day life. It is only certain principles, and not the thousand deductions from them which are required for actual practice, that the druggist can



gain from works like FARADAY's "Manipulation." This truth will be immediately admitted by all judges of the subject. Dr. CHRISTISON, in the preface to his recent edition of the Edinburgh Dispensatory, apologizes for omitting the treatise on pharmacy which had been prefixed to the earlier editions of the book, by observing, that it ought to constitute a work of itself, for the benefit of druggists.

But how is this acknowledged defect to be supplied? By the efforts of practical men, by the gradual accumulation of facts, even though many should erroneously appear too trifling to be registered. What LIEBIG has said of Organic Chymistry is not less applicable to the investigations of pharmacy, "that we have only to stoop down, in order to pick up discoveries from the ground."

English druggists would be indulgent to the first edition of such a work, which would necessarily be but a sketch, to be expanded, by *their* contributions and suggestions, into a finished portrait of pharmacy as it is. The compiler of so desirable a compendium will not hastily reject any hints, however unimportant they may seem, but will be ready to exclaim—

Quantulacunque estis, vos ego magna voco!

So connected is pharmacy with the several branches of physics, galvanism, the doctrine of heat, &c. that scarcely a remedy can be prepared in which these sciences may not be rendered available. In constructing apparatus for the economic manufacture of any article used in medicine, how many plans may be first adopted, and then rejected, ere the necessary conditions are attained! A few years ago, who would have conjectured, that by forming a communication with the ground by means of a copper conductor, evaporation might be increased upwards of 33 per cent.\*?

To collect these scattered facts, and to show their bearing on the practice of chymistry, would be the grateful office of him who should write for the pharmaceutical laboratory. It is unnecessary to point out the boundless superiority of the student, ever on the watch for new facts, and discovering the future by the aid of the past, to the mere laborious unthinking drudge.

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\* See our No. for October 28, p. 156.

Nor are the public slow to appreciate the merits of the well-informed though self-educated *pharmacien*; for his establishment receives the preference which it deserves, over one where indolence and indifference bear sway; and where the master, from his ignorance of the properties of the medicine he dispenses, is but one remove from the boy, who carries it out. Such unfortunate instances, (let us hope they are exceptions,) afford a powerful instrument to contemporary rivals for keeping this, the lower branch of the profession, stationary, while all around are advancing.

The great secret of the position held by English druggists of the higher class, is, that while they are sometimes referred to by the friends of patients for an explanation of the intentions of the physician, they are still more frequently consulted by the philosopher for aid in his chymical investigations.

After all, works on pharmacy are but the means to a certain end, which unsparing diligence attains without them. Let the student, therefore, use the best that he can procure, but rely on his own industry for improvement.

The frequent hours of leisure which are at the disposal of the majority of druggists and their assistants, invite them to take a high standing indeed, as well-informed and useful members of society. Let them profit, then, by the golden moments as they fly. It will be too naturally supposed that those who do not, have scrambled into a profession, where, though distinction is within their grasp, idleness or bad habits oppose an insurmountable barrier. The contempt which they have secretly anticipated will assuredly be their lot, for the advance of the many will only bring out in more marked relief the sluggish immovability of the few.

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## CHYMISTRY, OPERATIVE AND EXPERIMENTAL.

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### ART. II.—*Further Notice of the New Antidote for Corrosive Sublimate.*

M. MIALHE, who has introduced the protosulphuret of iron as an antidote for corrosive sublimate, is of opinion that it is not confined to mercurial salts alone, but that it will equally serve to counteract the injurious effects of the salts of lead and copper. In preparing it, (the formula being now first given by

the author), M. Mialhe recommends the use of water that has been boiled, to prevent the oxidation of the precipitate, which he directs to be prepared with the bihydrosulphuret of *soda*, and to be preserved under distilled water (also previously boiled), in a vessel filled to the cork.—*Journal de Pharmacie*, October.

[The precaution of boiling the water is advisable, and it should also be allowed to cool in a closed vessel; but as the bihydrosulphuret of soda is not kept ready prepared by chymists, we refer them to the directions given (before M. Mialhe had announced his formula), at page 76 of this journal. We also differ from M. Mialhe as to the change which occurs in keeping this precipitate. M. M. states that it has a great tendency to pass into the state of sulphate; we, on the contrary, are of opinion that an oxide of iron is formed, with separation of sulphur.—ED.]

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ART. III.—*Action of Cyanide of Potassium on Metallic Oxides and Metallic Sulphurets in the Moist Way.* By MM. HAIDLEN and FRESENIUS.

[Concluded from page 207.]

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23. *Separation of Quicksilver from Copper.*—The proceedings are exactly the same as for the separation of cadmium from copper.

24. *Quicksilver from Lead.*—Cyanide of potassium is added in excess, and the solution heated. The lead remains perfectly insoluble, whilst the quicksilver is dissolved, and may be precipitated as sulphuret of quicksilver.

25. *Separation of Quicksilver from Bismuth* is effected in the same manner as quicksilver from lead.

26. *Separation of Quicksilver from Cadmium.*—Cyanide of potassium is added until the precipitate produced is redissolved, very dilute nitric acid is then added in excess, and the mixture submitted to ebullition. The cyanide of quicksilver is not decomposed; the cyanide of potassium and cadmium are, however, converted into their respective nitrates: after the hydrocyanic acid has been completely expelled by boiling, the cadmium is precipitated by carbonate of potassa, and the quicksilver contained in the filtered liquor is thrown down by sulphuretted hydrogen.

27. *Separation of Platina from Lead and Bismuth.*—Cyanide of potassium in excess is added to the solution. The lead and bismuth remain undissolved, whilst the platina is taken up, as platino-cyanide of potassium. This is boiled with muriatic acid, until the hydrocyanic acid is completely given off; alcohol is then added, and the platina precipitated by sal ammoniac as platino-muriate of ammonia.

The process for separating more than two or three metals from each other may be easily ascertained by reference to the preceding directions.

## II. ACTION OF CYANIDE OF POTASSIUM ON OXIDES, SULPHURETS, SALTS, &c. IN THE DRY WAY.

Cyanide of potassium has a twofold application in the dry way, namely—

1. As a re-agent conjoined with the blow-pipe.
2. As a means of division and reduction in the crucible or glass-tube.

We examined its action on many oxides, sulphurets, salts, &c. in reference to both these peculiarities: we intend, however, to introduce here only those results which seem to possess some interest either *de ipso*, or for the purposes of chymical analysis. We employed for these experiments sometimes the pure cyanide of potassium, and sometimes a mixture of equal parts of anhydrous soda with cyanide of potassium. The several details will be narrated under the different experiments.

As the cyanide of potassium melts so readily under the blow-pipe in these cases, we always used the above-mentioned mixture. It acts in general so very similar to pure soda, that it would be superfluous to describe singly the changes which each individual body appeared to undergo when exposed to its action. We cannot, however, pass over the following especial advantages which it possesses, as compared with soda,—1stly, reductions are obtained with so great facility that the least practised operator may execute reductions which would otherwise be very difficult; for instance, the reduction of tin from either oxide or sulphuret of tin, &c.; and 2dly,—that the fused mixture of cyanide of potassium with soda is so easily absorbed by the charcoal, that the grains of reduced metal can always be most distinctly perceived, and may be easily separated therefrom for further examination.

On salts of nitric and chloric acids cyanide of potassium acts in a peculiar manner; fused with the latter they decompose with violent explosion, and evolution of flame to such an extent, that it is advisable to be cautious in operating with large quantities, more particularly with chlorates. By this property it affords a most excellent means of discovering such salts in the dry way. If mixed with cyanide of potassium, and heated on a plate of platina, a very perceptible detonation, accompanied by the evolution of light, will ensue, even if very minute quantities only of these salts be present.

The reducing properties of cyanide of potassium, when fused with oxides and sulphurets, are already well known (alas! only in Germany) from the treatise of Liebig. They afford, according

to our experiments, another very important application, as may be seen from a perusal of the following examples.

1. *For discovering Arsenic in rough Sulphuret of Antimony.*—It is known that, during the examination of arsenious sulphuret of antimony with the blow-pipe, the garlic smell of arsenic cannot always be detected with certainty, on account of sulphurous acid being formed. It has, therefore, been proposed to reduce the antimony, in the first instance, from the state of sulphuret, by fusion with iron, Glauber's salt and charcoal, or in any other way, and then to examine it under the blow-pipe. This method of examination would leave nothing to be desired, if it were not so difficult to produce the regulus in experiments, when operating with small quantities, on account of the high temperature required. The cyanide of potassium furnishes wherewith to remedy this inconvenience, since we are able, in the space of a few minutes, using a porcelain crucible, to produce a well-fused regulus from powdered commercial sulphuret of antimony by heating it over the spirit-lamp with three or four parts of cyanide of potassium. The arsenic is equally well preserved by this method as by the other.

2. *Preparation of Metallic Reflectors from Combinations of Arsenic.*—For the reduction of arsenious acid and arsenates, equal parts of soda and cyanide of potassium furnishes an excellent admixture. The perfectly dried arsenical combination is put into a glass-tube, with a small bulb blown at the end, and about six times the quantity of the previously mentioned mixture, likewise perfectly dry, poured over it. The ball must not be filled more than about half full, otherwise the cyanide of potassium, during fusion, is apt to rise in the tube. Reduction ensues by heating over a spirit-lamp. All those arsenious and arsenical salts, the bases of which are either not in the least reduced, or reduced to such arseniurets as, by the action of heat, lose their arsenic partly or entirely, yield, when fused with cyanide of potassium, metallic reflectors. We obtained the most perfect mirrors from the following combinations of arsenic, arsenious acid, sulphuret of arsenic, arseniates of potassa, barytes, lime, oxide of silver, and oxide of copper. Arseniates of peroxide of iron and of lead yielded only imperfect mirrors. The method of reducing combinations of arsenic by cyanide of potassium deserves special attention, on account of its simplicity, the certainty of the results even when extremely minute quantities of arsenic are operated upon, as well as for the cleanliness with which the process may be executed.

Besides the reducing properties for which cyanide of potassium is so extremely valuable, it possesses peculiar properties as a flux. In the following cases it seemed to us to yield these advantages for analysis :—

*Decomposition of Sulphates of Alkaline Earths.*—If the sulphates of lime, barytes, or strontian, are fused with a quadruple or quintuple quantity of the mixture of soda and cyanide of potassium (repeatedly before mentioned), sulphate of soda and carbonated earths are obtained by dissolving the former in water. The decomposition, therefore, proceeds in the same way as on the application of pure soda. The presence of the readily fusing cyanide of potassium, however, possesses this advantage, that a porcelain crucible and a simple spirit-lamp merely are required, and not, as with soda, or when soda and carbonate of potassa are used, a platina-crucible and the application of intense heat. This method of separation is very convenient, if not for quantitative, at least for qualitative analysis.

*Decomposition of Silicates.*—Cyanide of potassium acts also in this case as a ready flux, and enables us to separate finely-pulverized silicic combinations (our experiments were made with well-pulverized sand, glass, &c.) in a porcelain crucible over the spirit-lamp. In certain cases this affords considerable advantages for quantitative analysis. To one part of the silicic combination five parts of the mixture of soda and cyanide of potassium must be added.

SEPARATION OF COMBINATIONS INSOLUBLE IN WATER AND ACIDS  
FOR QUALITATIVE EXAMINATION.

In qualitative examinations, after extracting those components soluble in water and acids, residua, insoluble in both, are, as is well known, finally obtained. As representatives of these latter we may mention sulphate of barytes, sulphate of lead, and silicic acid. It is known that the separation of these substances is accompanied with several inconveniences, founded partly on the difficulty of removing the lead completely in the moist way, and partly on the circumstance that the heat required for their decomposition with soda in the porcelain-crucible can scarcely be attained by a spirit-lamp; whilst, on the other hand, a platina crucible is affected at a higher temperature. The cyanide of potassium affords a ready means for removing this inconvenience. If the before-mentioned substances are fused with four or five times their quantity of the mixture, the sulphate of oxide of lead is reduced, the sulphate of barytes is converted into carbonate of barytes, whilst the silicic acid combines with the alkali. If the whole is then treated with water, the latter is obtained in solution. Acetic acid poured over the residue removes the carbonate of barytes, whilst reguline lead remains undissolved.

Having stated in the preceding paper the most important results of our experiments concerning the action of cyanide of potassium on bodies, we may be allowed to announce our conviction that cyanide of potassium, on account of the peculiar and

multifarious purposes to which it may be applied, may be fairly placed in juxtaposition with the most important adjuncts of chymical analysis.—*Woehler, in Liebig's Ann. d. Chem. u. Pharm.* August, 1842.

ART. IV.—*Two new Minerals, Saponite and Rossite.*

M. SVANBERG has given an account of two newly-discovered minerals—saponite and rossite. The former resembles, in its exterior properties, the soapstone. It has been found in the parish of Sverdsji in Dalarna, and also in the pits of Brucksvede Swartirk. At the latter place masses of this mineral, two inches in diameter, and nearly pure, have been found in a soft state, almost like butter, which induced indeed some people to make a trial of it, hoping that it might perhaps replace the latter. An analysis of that found at Brucksvede showed the following composition in 100 parts:—

|               |      |        |       |         |   |
|---------------|------|--------|-------|---------|---|
| Silicic Acid  | 50.8 | Oxygen | 26.44 |         |   |
| Magnesia      | 26.5 | "      | 10.26 | } 10.47 | 2 |
| Lime          | 0.7  | "      | 0.21  |         |   |
| Alumina       | 9.4  | "      | 4.39  | } 5.02  | 1 |
| Oxide of Iron | 2.0  | "      | 0.63  |         |   |
| Water         | 10.5 | "      | 9.24  |         | 2 |
| <hr/>         |      |        |       |         |   |
| 99.9          |      |        |       |         |   |

The substance to which the name of rossite has been given was found in a limestone pit in Södermanland, in the shape of small red grains, which proved on examination to be a new mineral; it is, however, found only in small quantities. The grains are generally about the size of a hempseed, red, varying from pale rosy to a brown red. By long boiling with muriatic acid these grains are slowly decomposed, leaving pulverulent silicic acid. The specific gravity is=2.72.—*Poggendorff's Ann.* Bd. lvii. S. 1.

ART. V.—*Researches on certain Circumstances which influence the Temperature of the Boiling Point of Liquids.* By M. F. MARCET.

PHILOSOPHERS generally admit that the temperature at which any liquid enters into ebullition, depends, 1st, On the nature of the liquid; 2d, On the atmospheric pressure; 3d, On the nature of the vessels in which ebullition takes place. It is to this last point that M. Marcet has particularly directed his attention; and after an immense number of experiments, he has arrived at the following conclusions:—1st, That the boiling point of water, in glass vessels, varies between 212.54° and 215.6°, according to different circumstances, and particularly according

to the quality of the glass employed. In every case the temperature of the steam furnished remained sensibly the same, and is constantly lower (the fraction of a degree) than that furnished by water boiling in a metallic vessel.

2d, Whatever the nature of the vessel employed, the temperature of the steam furnished is always beneath that of the boiling liquid which furnishes it. When glass vessels are employed, this difference, at a medium, is  $1.9^{\circ}$  F.; if metallic vessels be employed, it varies from  $0.27^{\circ}$  F. to  $0.36^{\circ}$  F. There is only one exception to this rule, which is, when the vessel, whether of glass or of metal, is covered with a thin layer of sulphur or shellac, or any analogous substance, having no sensible attraction for water. In this case only, the temperature of the vapour is found identical with that of the boiling liquid which furnishes it.

3d, Contrary to the generally received opinion, a certain temperature being given, it is not in a metallic vessel that the temperature of boiling water is at the lowest possible degree; for it will be found that in a glass vessel covered with a thin layer of sulphur, shellac, or any other similar substance, this temperature is, by some fifths of a degree, lower than in a metallic vessel.

4th, In vessels made of perfectly pure glass, free from any foreign matter, water, and also alcohol, may be heated, without ebullition taking place, to a temperature much higher than has been hitherto usually believed. We may in particular obtain, in this manner, water (not boiling) heated to  $221^{\circ}$  F.: if this does not happen in every case, it will be found that the surface of the glass is not perfectly smooth, although apparently so, and that it contains foreign matters, which are adherent thereto, and which may be removed by different methods, more particularly by the action of concentrated sulphuric acid.—*Ann. de Chimie*.

#### ART. VI.—On *Theobromine*. By Dr. BLEY.

WOSKRESENSKY has procured from the cacao nut a peculiar principle, to which he has applied the above name. By digesting the nuts in distilled water, straining the decoction, and mixing with acetate of lead, after filtration, the oxide of lead being removed with sulphuretted hydrogen, the clear liquor is evaporated, when a reddish-white powder, *theobromine*, is obtained. My experiments have proved that an identical principle may be obtained from the shells of the cacao nut, although only in small quantity, since I could obtain from 16 ounces of the shells, but 5 grains of this principle. Since, however, these shells are at present of no value, and consequently are to be procured in large quantity, *theobromine* may be obtained therefrom at a more economical rate than from any other source.—*Archiv der Pharmacie*, B. 79, S. 201.



ART. VII.—*Acetate of Soda.*

ANTHON obtained acetate of soda, with 9 atoms of water, when preparing it by elective affinity, using acetate of lead and sulphate of soda. It yielded beautiful needle-shaped crystals, containing 49.8 per cent. of water; whose composition was as follows:—

|                       |   |              |               |
|-----------------------|---|--------------|---------------|
| 1 atom of soda . . .  | = | 31.9         | 19.16         |
| 1 „ acetie acid . . . | = | 51.0         | 31.24         |
| 9 „ water . . .       | = | 81.0         | 49.60         |
|                       |   | <u>163.8</u> | <u>100.00</u> |

*Archiv. der Pharmacie*, Sept. 1842.

## CHYMISTRY APPLIED TO AGRICULTURE.

ART. VIII.—*Some Remarks on the preceding Experiments of De Saussure, on the Nourishments of Plants.* By J. LIEBIG.

[Concluded from page 184.]

By a summary of the results of De Saussure's experiments, we obtain the following facts:—

A horsebean, vegetating for a fortnight in a solution of humate of potassa, increases in weight by

6000 milligrammes (6 grammes)=92.6 grs.

and has consumed for this increase in weight, as defined by direct experiment—

9 milligrammes of humus=1-10th of a grain.

In a second experiment, a specimen of *polygonum persicaria* (a marsh plant) increased in a solution of humus, during a space of time not defined—

3500 milligrammes=nearly 54 grains,

for which it had consumed, according to the calculation—

43 milligrammes of humus=.662 gr.

In a third experiment, two specimens of *polygonum persicaria* increased in nine days by seven centimetres (nearly three inches); and had besides this shot forth roots, for which they consumed from the extract of mould—

5 milligrammes=.077 gr.

These experiments, therefore, prove, with the strictest accuracy, that, presuming the humus to be absorbed in this form, and in no other, its quantity, even under the most favourable conditions (where the water, in which the plant vegetates, contains

more humus than the plant is able to absorb with that water) is very small, and that the plant, in the first experiment,

Assimilated, in 100 days, 1-10th of a grain of humus.

According to the last experiment, two specimens of *polygonum persicaria* consumed together in nine days 5 milligrammes = .0770 gr. One specimen, therefore, in 100 days, 1-30th of a grain.

It follows from this, that the quantity of extract of mould (by itself, or combined with carbonate of potassa) absorbed by a plant, when nourished therewith under the most favourable circumstances, is so small, and therefore so difficult to define, that it is not unfair to suppose the possibility of inaccuracy of observation; that is to say, that the experiments, which go to prove the absorption of humus by the roots, do not possess the requisite power of demonstration.

If now, besides this, it can be proved, with the greatest certainty, that a solution of humus experiences, by the influence of the air, continual change, a true decomposition, in consequence of which carbonic acid is formed from its component parts\*, why, it may be asked, in the new experiments of De Saussure, has this influence of the atmosphere, which he himself ascertained, not been taken into account, in order to explain the loss in weight of the carbon in his test liquors? Every one who is a little conversant with M. De Saussure's researches, will easily be able to answer this question.

Respecting the part attributed to ammonia in vegetation, it has been objected to me that many plants, namely, vegetables, taste of animal manure, when it has been applied to them in too great quantity, and that herbivorous animals do not eat the grass or hay of meadows manured with dung water. The truth of these facts cannot be doubted, and it may be the same with those plants which grow on marshy meadows, and on a soil containing animal or vegetable matters in a state of putrefaction, to which the atmosphere has not free access.

All these observations evidently prove, then, that all such foreign matters take no part in the process of vegetation of the plant; for, supposing this to be the case, all those odorous and sapid components of manure or dung water would not have preserved their peculiarity: they would have lost it necessarily if the plant had consumed them for its development!

A plant absorbs, like a sponge, all soluble components of the soil; but in coloured fluids, in solutions of dying materials, the plant, by absorbing them, becomes sick, and dies.

Now the earths of arable land and mould, in which plants

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\* We had not perused this observation of Liebig at the time we perused the note, page 42.—Es:

vegetate most vigorously, do not contain any matters that can be extracted by rain water, or which dye the water (that is, no humus soluble in water); for, as I have before observed on another occasion, we should easily discover them in the colour of the springs of our meadows and of our forest brooks. And whence, then, is the humus derived which is required for the myriads of plants vegetating in the sea?

The water of our wells is in general colourless and transparent; in calcareous soil it is rich in bicarbonate of lime, without humus. This carbonic acid derives its origin from vegetable matter: it is humus which, without dissolving, yields this gas by its own decomposition.

The springs in meadows and marshy places, impregnated with iron, contain it in the form of protoxide dissolved, instead of lime, in carbonic acid—a combination which forms only in the upper strata of mould. By deepening these springs, the water ascending from beneath is found free from iron, and their contents of carbonic acid are very much diminished. How is it possible, taking in account so many well-known facts, to entertain the least doubt as to the true part which mouldering vegetable matters (humus) act in the nutrition of plants?

Certainly most plants vegetate, in pure quartz irrigated with distilled water, only very scantily, while they are developed more vigorously in good and appropriate mould. But plants require, besides water and air, other conditions for the process of nutrition, which the quartz does not yield to them, and without which they likewise vegetate scantily in mould if these conditions are not present. All inferences which may be drawn from experiments of this kind do not possess any validity in the present day.—*Liebig's Annalen*.

[We have thus set in apposition the views of two opposing parties as to the nutrition of plants: we leave our readers to award the palm, as at present contested.—ED.]

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ART. IX.—*On the Subsidence of the Sap in Trees in consequence of the presence of Sheep.*

L'ECHO DU MONDE SAVANT contains, in the number for the 30th of October, the following article:—

“M. Bouteille has written to us, in reference to an article having for its title as above, and which appeared in our journal of the 23d instant, by M. Poiteau,—‘The inhabitants of the country,’ says M. Bouteille, ‘particularly the wood-cutters who remove the bark from oak trees in forests, all know that the neighbourhood of a flock of sheep will hinder them from pursuing their work, by preventing the circulation of the sap, which

renders it almost impossible to decorticate the trees. This fact, so worthy of exciting the attention of physiologists, has never been studied. Many instances of this singular phenomenon have been noticed by different journals, but they have never given the least explanation thereof. M. Bouteille complains, and with some reason, that they have never sought to render an account of it.

" M. Raspail inserted, in the *Réformateur* of November 25th, 1834, the following article :—

" ' Fascination de la sève des arbres ;  
Riez en, mais ensuite vérifiez. '

" ' We find, in a number of the Annals of the Society of Agriculture of Charente, an opinion that we scarcely dared to announce, until it had gone the round of all the country papers.

" ' The author asserts, that the presence of a flock of sheep suffices to arrest the course of the sap of trees, which causes, according to the author, the bark so to adhere to the wood, that the barking is thereby rendered most difficult. What should be the cause of this fascination ? We are ignorant. '

" M. Raspail afterwards published his *Vegetable Physiology*, and the second edition of his *Organic Chemistry*, but these works contain nothing on the subject.

" M. Bouteille demands that the Academy should institute a commission to study the subject. He thinks that if the air be analysed, so as to ascertain the principles it contains, particularly at that period of the year when the sheep are still covered with their thick fleece, impregnated with a large quantity of greasy matter, this latter will be found to give out much ammonia to the atmosphere, which may be perceived at some distance from the flock. M. Bouteille attributes to this odour the cause of the phenomenon in question, but he does not account for the manner in which it acts. It is more than probable that M. Bouteille is in error ; the ammoniacal exhalations would only assist vegetation.

" M. Maleysie goes much further than M. Bouteille ; for he believes that the neighbourhood of a flock is opposed to the growth of young trees,—an opinion which is partaken by most cultivators. The only harm that sheep can commit is to rub the bark from the young plant, which thereby perishes. We must, then, seek elsewhere for the cause of this singular phenomenon."

[We would suggest, for the consideration of our contemporary, that if the air adjoining the forest be analysed at the time when the neighbourhood of sheep is simultaneous with the arrest of the sap, such air will be found to be very deficient in *caloric*, which not only prevents the flow of sap, but excites the instinct of the flock to seek the shelter of neighbouring trees.—ED.]

## PRACTICAL PHARMACY.

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### ART. X.—*Manufacture of Milk of Sulphur.*

ACCORDING to Anthon, one hundred parts of finely divided anhydrous gypsum, (plaster of Paris,) are intimately mixed with eighty-three parts of finely powdered charcoal powder, and formed into balls by means of water: after slightly drying, these are exposed to a red heat for six or eight hours: when cool, the mass is mixed in the proportion of one hundred parts thereof, with one hundred and ten or twenty parts of sublimed sulphur; this mixture is thrown into boiling water, and kept at the boiling point for one or two hours. The clear solution is then poured off, and boiling water again added to the residue, ebullition being maintained for some time: the several solutions are then mixed, and the sulphur precipitated therefrom with dilute hydrochloric acid, until no further deposition ensues by the addition thereof: the precipitate is then washed, collected and dried, and yields from twenty to twenty-five per cent. more milk of sulphur than the sublimed sulphur employed.—*Archiv. der Pharmacie*, 13, 81, s. 312.

[The above process yields a very pure milk of sulphur, during the preparation of which the vessels are not injured as by the present method of manufacturing: we fear, however, manufacturers will never be induced to substitute muriatic for the sulphuric acid now used, unless those who are in communication with the retail purchaser will be at the pains to explain the injurious effects of the large proportion of sulphate of lime with which this article, as commonly sold, is contaminated.—Ed.]

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### ART. XI.—*On the Preparation of Otto of Roses.*

[Being a Communication from Arabia, by M. LANDREER, to the Editor of Buchner's Rep.]

THE rose trees in the neighbourhood of Mecca, and near the sea of Galilee, are of greater value than the olive and lemon trees in Italy and Greece. A rose shrub costs from 50 to 60 florins—from £4 to £5, and is given as a dowry to the daughters of Armenians, who are chiefly occupied with their growth and cultivation. Rose trees, which attain a height of eight or ten feet, are cultivated with special care, the gardens being regularly freed every month from all weeds, and frequently manured and irrigated. Heavy rains during the winter indicate a plentiful harvest of roses. It is considered as of great service in accelerating the time of blooming, if ashes and camels' dung are spread on the rose shrubs. The small rose gardens are divided into quadrangular partitions, and so well hedged round with

Cactus plants, and other prickly shrubs, that it is impossible for animals to get through them. Great attention is paid to these hedges, which attain a height of from 12 to 14 feet; at the same time, they do not cause much expense. In the larger rose gardens there is situated in their centre a small tower or observatory, so arranged that the garden and neighbouring plantations may be watched therefrom. During the time of blooming, well-armed watchmen are placed in these towers, to prevent pilfering the roses, which would otherwise frequently occur. As soon as the roses begin to bloom, and sometimes before, the rose-dealers pass through the country, in order to purchase the roses before they are removed from the shrubs. These transactions are generally arranged in the bazaars by the mediation of Jews, who act as brokers. At the time of blooming, children and women repair to the gardens before sunrise, with bags and baskets, in order to gather the roses, and to carry them to places where they are either preserved for exportation, or where they are distilled. If the roses are intended to be kept fresh for any length of time, they are most carefully freed from the calyx and green leaves, and then placed in large clay-vessels and covered with salt. If they are intended, as is commonly done, for preparing the otto of roses, they are carried to the distilleries, where frequently from three to six stills are kept, the apparatus for cooling the distilled liquor being very imperfect. The cleaned roses are put into the still, and water poured over them, together with a considerable quantity of salt. After having been left for two or three days to macerate, the operation of distilling is commenced, and continued until the distilled liquor begins to assume a yellow colour. The rose-water is taken away, from time to time, and decanted for cooling into clay-vessels placed in water. To these different portions different names are given; and they differ exceedingly in value: for instance, a bottle, containing about twelve quarts of the liquor obtained at the beginning of distillation, sells for 150 to 200 piasters (= £1. 11s. 3d. to £2. 1s. 8d.), while a similar quantity, obtained towards the end, may be purchased in the Bazaars of Alexandria, Cairo, Constantinople, and Smyrna, for 20 piasters (= 4s. 2d.)

The rose-water obtained at the commencement of the process is used for preparing the oil of roses, which is separated therefrom as follows:—Large porous clay-vessels are filled with this water, and tied over with linen; after which they are placed in trenches dug in the earth, where they are left from six to ten days, according as the nights are more or less cool. They are covered over with straw moistened with water, in order, by its evaporation, to keep them as cool as possible. The water then becomes gradually covered with an oily film, which condenses to a crystalline mass. This is taken off with a skimmer, and

the water repeatedly undergoes the same cooling process, until no further traces of oil appear. After being thus deprived of all the oil therein contained, the water is then brought to market for sale, or employed for preparing an inferior sort of otto, which is afterwards exported to Europe as fine Turkey otto. This kind of otto is met with in the Bazaars of Constantinople, Smyrna, &c. and is obtained by strongly agitating the rose-water, which is still very fragrant, with an oil received from Africa, distilled from the wood of some odoriferous tree. After the oil has separated, it is again agitated with another portion of rose-water, lest it should not have assumed the proper odour of roses, and is then left to stand, or buried in the ground, until it has perfectly separated therefrom.

The consumption of otto of roses and rose-water is very considerable in the East, partly for perfumery, which is much used, and partly for preparing liqueurs, confectionery, and so forth. In the houses of people of rank the staircases and floors are sprinkled with rose-water, in order to impregnate the abode with the odour of roses. At religious ceremonies, and weddings, the guests are sprinkled with water of roses and orange-blossom. Rose-leaves are employed also for preparing conserves, odoriferous toys, amulets, &c. For these latter purposes they are bruised in iron mortars to a uniform mass, mixed with ambergris, musk, &c., pressed into moulds of brass, and dried.

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ART. XII.—*Contributions to a Knowledge of Greek and Turkish Remedies.* By X. LANDERER, of Athens.

*Peculiar Exanthema, and its Cure.*—In some parts of Greece, but especially in the neighbourhood of Thermopylæ, about Libadia, a peculiar exanthematic disease prevails, which attacks both the young and old, more particularly females than men, and the symptoms of which are hoarseness, peculiar condylomata forming on the glands of the neck, and afterwards on the genitals, moist exanthemata, tormenting the invalid, especially during the night, by their violent itching. This disease seems to rank between lepra and syphilis, and is probably generated by both of them. The most talented physicians of Greece have tried various curative means against this complaint, but with indifferent success; probably arising from the circumstance that their patients did not pursue the proper medical treatment laid down, either from want of patience, or on account of their limited means. Some time since a surgeon presented a petition to the royal ministry, asking permission to be allowed to occupy himself exclusively with the cure of this disease; and in proof of his competency to treat the same, produced, before a medical commission, several patients whom he had perfectly cured. This

mode of treatment consisted chiefly in the internal and external application of mercury with chalk, and some beverages tending to produce perspiration, which were prepared from the *smilax aspera*.

*Hyoscyamus Albus, for Toothache.*—In some parts of the Greek continent, the stalks of *hyoscyamus albus* are used for toothache. They are dried, and employed in lieu of tobacco for smoking. [In England the seeds are occasionally employed for the same purpose with useful effect.—E.D.]

*Plumbago Europæa, for Issues.*—The *plumbago europæa* is frequently found in Rumilia, and in marshy places. Its roots are so acrid that they are used for causing issues, and even as a vesicant. If the more tender surfaces of the body are rubbed with the fresh root, the skin will be reddened in a few moments; and if the root is allowed to remain for a short time, it will be soon covered with small blisters.

*Method of Curing Ague among the Mainots.*—The following is a celebrated remedy for ague in Maina:—Equal parts of *nissatisi*, (hydrochlorate of ammonia), and pepper, are mixed with *betmesi* (wine evaporated to the thickness of syrup, and mixed with ash, so as to form an electuary), of which the patient takes a table spoonful some hours before the commencement of the paroxysm. After this dose has been repeated three or four times, the fever seldom returns.

*Remedy for Chronic Disease of the Skin.*—An excellent curative for chronic disease of the skin, which is used as a specific in many parts of Macedonia, is an infusion made with root of *attich* (*sambucus ebulus*) and the stalks of *ἀκρονόβαλος* (*smilax sarsaparilla*.) This latter name is formed from *ἄρκτος*,=bear, and *βαίνειν*, to climb, because this plant climbs on others. This infusion is said to possess purgative powers.

*Styptic.*—As a styptic, roasted coffee, with vinegar, is held in high esteem. By the application of this remedy, I have seen violent hemorrhage quickly arrested.

*On Clematis Flammula.*—The *clematis flammula* is employed for the cure of exanthematic diseases. This beautiful shrub is found uncultivated throughout the whole of Greece, especially in the wold of olives, in the neighbourhood of Athens, where it ornaments the bed of the river Rephissus. It there attains to the height of from 12 to 14 feet, and its flowers fill the evening air with an exquisitely fine and aromatic fragrance, while at other times of the day not the slightest perfume is observed in its vicinity; wherefore the damp evening air seems to be necessary for the evolution of these aromatic exhalations.

I have learned, by my own experiments, that moisture is required to be present in order to cause the evolution of this fragrance. In order to disengage it from the plant in bloom, I



caused about thirty pounds of the flowers to be gathered before sunrise, and subjected them to distillation. I obtained, however, contrary to my expectations, a product which possessed merely an herbaceous odour, but of a singularly pungent taste. I cohobated the product over another quantity of fresh gathered flowers, but this distilled product did not in the slightest degree answer the expectations I had entertained. By repeated cohobation, during which I distilled only six ounces of liquid, no better result was obtained. The taste of this distilled product was, however, so pungent, that it produced a momentary burning and pain on the tongue, which was only alleviated by spreading over it a fat oil. In order to separate this pungent substance, I dissolved in the distilled water a sufficient quantity of common salt, and set the solution in a mixture of ice and salt. After some time a stearoptine mass of a bright pearly appearance separated, which easily melted, and readily dissolved in spirit of wine, also in fat and essential oils. These solutions were of an exceedingly pungent taste, and, rubbed on the skin, produced violent burning and redness. Heated in a platina spoon the mass was evaporated after melting, evolving an odour similar to that of decomposing wax, ignited, and the evolving fumes caused a flow of tears. Besides this pungent substance, the distilled liquor seemed to contain acetic acid, for it indicated an acid reaction; and when condensed by evaporation, first neutralizing with carbonate of soda, and then distilling the saline residue with diluted sulphuric acid, an acid was obtained possessing all the properties of acetic acid.

As I was unable to obtain by these processes the substance which I consider as the very agreeable odorous principle of the plant, I now proceeded with the flowers in the way jessamine flowers are treated, by placing them in layers in a glass cylinder between flannel imbued with fresh oil of almonds, and replacing the flowers, after having extracted their odour several times in this way, with those which had been fresh gathered in the evening. I thus obtained a fat oil of the finest odour, and of very little pungency. This oil resembled that of jessamine, and even surpassed it in delicacy and sweetness of odour. By distillation with absolute spirit of wine, I obtained a slightly odorous spirit, which seemed to contain only some traces of the essential oil.

*On Arum Dracunculus.*—A plant frequently occurring in the moist districts of Greece is the *Arum Dracunculus*, the roots of which are used by the country people against the bite of snakes, and likewise as a remedy for scrofulous tumours. It is frequently met with in the olive plantations in the neighbourhood of Athens; where, at the time of flowering, it diffuses an odour so strong, disgusting, and putrid, that, on approaching, it might

be inferred as caused by animal matter in rapid putrefaction. By remaining for a short time in the vicinity of the blooming plant, dizziness, headache, and vomiting, ensue. Many workmen are attacked by these symptoms of poisoning in the gardens of the olive tree, when obliged to expose themselves to the offensive exhalations of this plant. This offensive smell is only evolved from the spadix after the husk of the flower has opened, and continues during the blooming of the plant. At morning and evening it is strongest; for which reason, in this case also, a certain degree of dampness in the atmosphere seems necessary for the evolution of the odour. One evening I gathered about forty of these spadices,—an occupation which induced a violent headache and sickness.—*B. R.*

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ART. XIII.—*On the Adulteration of Jalap-resin.*

SOME short time since I discovered a very gross system of adulterating the resin of jalap. This adulteration is executed by fusing resin together with scammony, adding, at the same time, a few drops of Peruvian balsam, or that of Tolu, which imparts to the artificial resin an odour and colour very similar to those of the genuine resin. This fused mass is then decanted into paper capsules, or into moulds of tin, and sold throughout the East in lieu of genuine resin of jalap. I am told that this admixture produces the same effects as the genuine resin, without inducing inflammatory symptoms so frequently.—*Landerer, in B. R.*

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ART. XIV.—*On the existence of Lead in Aqua Naphae and Aqua Rosarum.*

IN some islands of the Archipelago, especially Naxos, Tinos, Cyprus, and Chios, many persons are occupied in preparing rose water, and also orange-flower water. The former is called *ροδοσταμνον*, and the latter *ανθόσταμνον*, and these being esteemed as a specific against all diseases of females, it is kept in almost every house. These waters are distilled in copper stills, without any proper arrangements for cooling; wherefore the distilled liquor is generally of a brown colour, and mucilaginous; nevertheless, the odour and taste of these waters are excellent. As I cannot employ them in their usual condition for medical use, although many pharmaciens are not so scrupulous, I submit them to a second distillation, in order to obtain a colourless product. In doing this, I repeatedly observed that the waters partly lose their odour after rectification, which they recover only after having been carefully kept, or by standing in a warm place, when mucilage is again perceived in them. Since, however, a dark colour decreases the value of these waters, it is the custom to

render them bright by placing therein plates of lead or shot corns. This practice causes them to assume a brighter colour, but at the same time lead is dissolved, as I several times ascertained by instituting legal examinations in the apothecaries' shops.—*Landerer, in B. R.*

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ART. XV.—*On the Manna of the Hebrews, from Lebanon.*

I OBTAINED a short time ago, from an ecclesiastic arriving from Lebanon, a substance, consisting some of small and some large grains, varying from the size of a millet-grain to that of a small walnut, with the remark that it was the bread with which God fed the Israelites, and that it came from a plant which is found in the most bare and sandy parts of Egypt, in Arabia, and at the foot of Mount Lebanon. All these plants do not yield this bread, but only those the leaves and fresh twigs of which have been gnawed off by goats: this substance begins to exude in the month of July from the bark and twigs in a liquid state, and towards the end of August is sufficiently dry to admit of its being separated from the shrub by strongly shaking the latter. "Such a shrub," he added, "yields 15 drachms of what is called 'the bread from Heaven.'"

As regards the plant, I believe it to be *Hedysarum Alhagi*. The substance exuding from it is of a sweet taste, but afterwards causes a tingling in the mouth, and is inodorous. It consists for the greater part of mucilaginous sugar, mannite, a resinous substance, and some traces of muriatic salts. In the ashes remaining after combustion, carbonate and phosphate of lime, and sandy matters, were found. This bread is collected on the Libanus by the shepherds and monks, and sold. It is considered as possessing sanitary remedial powers against pulmonary complaints, and especially against hoarseness and cough.—*B. R.*

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ART. XVI.—*On the Preparation of Iodide of Potassium; being a Digest of the Treatise on the above Preparation, which gained the Prize of the Hagan Bucholzian Foundation.* By OTTO EDER.

[Continued from page 227.]

3. *Preparation by means of Iodide of Antimony.*—The greatest difficulty met with during this process is the preparation of the iodide of antimony, which can hardly be obtained without a loss of some of the iodine. If twenty-two parts of antimony and sixty-four parts of iodine are rubbed together, in the course of from a quarter to half an hour (according to the fineness of the powdered antimony employed), a dark kermes-brown mass is obtained. During this operation the operator suffers from the continually-evolved fumes of iodine. The iodide of antimony

thus obtained still contains both free iodine and metallic antimony, for which reason the mixture still evolves an odour of iodine; agitated with water, a dark-brown solution is obtained, whilst iodide of antimony purified by sublimation is of the colour of Kermes, approaching to vermilion. In order to obtain therefrom iodide of potassium, one ounce of finely triturated iodide of antimony was boiled three several times with water. The first solution obtained was very acid and of a yellow colour, the second indicated a feeble acid re-action and was very slightly coloured, the third entirely colourless. The insoluble residue, whose red colour had become changed into yellow, was then boiled three times with a weak solution of carbonate of potassa, which operation imparted to the residue a gray colour, after which no further trace of iodine could be discovered therein. The alkaline and acid fluids thus obtained were mixed together after filtration, when a yellow flaky precipitate was obtained in colour perfectly similar to that which is formed after iodide of antimony has been exhausted with water. This precipitate could scarcely be considered as any other than a combination of iodine with antimony; and this view was confirmed on submitting it to analysis. The ley of iodide of potassium, which indicated a neutral reaction, was evaporated and set aside for crystallization, when it yielded 6 drachms 54 grains of a perfectly white and neutral iodide of potassium unmixed with antimony.

4. *Preparation by means of Sulphuret of Potassium and Iodine.*

—In this case we first followed the suggestion of Taddei: one ounce of iodine was dissolved in 16 ounces of alcohol, and to this was added a filtered alcoholic solution of sulphuret of potassa (*hepar sulphuris*), until the colour (of iodine) had entirely disappeared, for which purpose nine drachms of sulphuret of potassa were required. The liquor filtered from the disengaged sulphur was colourless and perfectly neutral. The sulphur collected on the filter, after being washed with eight ounces of alcohol, did not contain any further trace of iodine. The spirituous solution of iodide of potassium was subjected to distillation in a retort in order to recover the spirit of wine. When about three-fourths of the alcohol had passed over, the remaining portions in the retort became slightly turbid, and on examining the matter disengaged, it proved to be sulphur.

When 26 ounces of alcohol had passed over, the contents of the retort were diluted with water, then filtered and evaporated to dryness. The dry residuary salt had assumed a brown colour, and evolved a perceptible odour of iodine; by exposure to an increased heat in the platina crucible, and also in a glass-tube closed at the inferior extremity, after fusion, violet vapours of iodine became visible. The residuary salt after heating to

redness was of a gray colour, and when dissolved in water left a residue of finely divided carbon, caused by the iodine, whilst dissolved in alcohol, partly decomposing the latter; a combination of ioduretted carburet of hydrogen being formed, which had contaminated the iodide of potassium. This inconvenience we hoped to avoid by following the suggestion of Geiger, who directs the dry iodine to be passed into an alcoholic solution of sulphuret of potassium. The iodine then quickly dissolved, disengaging sulphur, and a colourless neutral liquor was obtained: when, however, the greater part of the alcohol had been removed by distillation, this solution likewise assumed a yellow colour during the progress of evaporation, which became the more intense as it became more concentrated. The residuary dry and offensively odorous saline product was likewise of a brown colour, and evolved, when heated in a glass tube, very perceptible vapours of iodine.

In order to avoid any contact of iodine in the free state, with the alcohol, another experiment was attempted as follows:—A filtered aqueous solution of nine drachms of sulphuret of potassa in four ounces of water was gradually mixed in a mortar, continually stirring, with one ounce of iodine, which quantity was sufficient to procure a colourless liquor without alkaline reaction. The iodine disappears by this method very quickly, and the formation of iodide of sulphur is prevented by the continual stirring: at any rate, the disengaged sulphur was perfectly free from iodine. The liquid, which with the disengaged sulphur had assumed a pasty consistence, was then diluted with six ounces of water, the sulphur collected on a filter, and again washed with twelve ounces of water. The ley of iodide of potassium thus obtained, and which, we must add, still contained all the sulphate of potassa contained in the sulphuret of potassa (*hepar sulphuris*), was reduced by evaporation to two ounces, and in order to effect the separation of the sulphate of potassa it was mixed with sixteen ounces of alcohol; after a lapse of twenty-four hours the liquid had become clear, and deposited a crystalline sediment. The clear solution removed therefrom by filtration did not contain any traces of sulphate of potassa; it was therefore submitted to distillation, and fourteen ounces of alcohol having been drawn over, the residue was set aside to crystallize. The weight of iodide of potassium obtained amounted to ten drachms 4 grains. The salt was almost white, but had a very disagreeable smell; it was perfectly neutral, dissolved easily and completely in water, and this solution, when heated with chloride of barium, did not become turbid in the slightest degree; thereby indicating the absence of sulphate of potassa.

Heated in a platina spoon it became first gray, evolving at the same time a disagreeable smell, after which distinctly

perceptible traces of sulphurous acid became free, which could only have arisen from the sulphur contained therein under the influence of atmospheric air. By heating in a glass tube closed at the lower end, no sulphurous acid fumes were disengaged, but a slight sublimation of sulphur took place. The semi-fused saline residue dissolved easily and completely in water, was perfectly neutral and had no smell, but the addition of chloride of barium now added to the solution, indicated the presence of sulphuric acid: A salt, contaminated with still more sulphuric acid, was obtained after the iodide of potassium had been heated in a platina-spoon.

If we are to judge from these experiments it would appear that sulphuret of potassium is contained in this iodide of potassium, which is decomposed by heating to redness.

[To be continued.]

## GALVANISM AND ELECTRICITY.

### ART. XVII.—*A Daguerreotype Experiment by Galvanic Light.*

By B. SILLIMAN, JUN., A.M., of the Departments of Chymistry and Mineralogy in Yale College; and WM. HENRY GOODE, M.D.

IN November, 1840, we succeeded in obtaining a photographic impression, by galvanic light reflected from the surface of a medallion to the iodized surface of a Daguerreotype plate. The large battery in the laboratory of Yale College, consisting of nine hundred pairs of plates, ten inches by four, was charged with a weak solution of sulphuric acid, and its poles adjusted with charcoal points, in the manner which is customary, when an intense light is to be produced by means of this instrument. Two pictures were obtained; one of which is made up of a blur, or spot, produced by the light from the charcoal points, the image of the retort-stand, on which a medallion of white plaster rested, and the image of the medallion, but the lines on its surface are not given. The camera was about six feet from the charcoal points, when this impression was taken, and the medallion a little on one side, and in the rear of the points. The plate was exposed to the light about twenty seconds, and no means were employed either for condensing the light on the objects to be copied, or that reflected from them, on the lens which gave the image. The only lens employed was a French achromatic, three inches in diameter, and of about sixteen inches focal length. Another picture was taken of the medallion only, which was placed about two feet from the charcoal points, and the camera about four feet from it, and in such a position that the charcoal points did not come within the field of the lens.

This picture, we regret to say, has been inadvertently destroyed. The plates used were of inferior quality, being some of the first of American manufacture.

These experiments were not published at the time they were made, because it was understood that a gentleman, distinguished for his scientific investigations, was already engaged in studying this branch of the subject, with whose researches we had no wish to interfere, and the matter was abandoned mainly for this reason. Having been informed recently, however, that this gentleman had also abandoned it, we have concluded to give this account of our experiments.

On the same occasion, an observation was made respecting the image given by the two charcoal points, when they were nearly in contact, and the battery in full operation, which we do not remember to have met with elsewhere. An image of each charcoal point is given, separate from that of the other, by a lens placed at a little distance. These two images differ remarkably in colour: one is the colour of the flame afforded by the combustion of an alcoholic solution of strontia; the other resembles in colour the flame produced by the combustion of an alcoholic solution of chloride of sodium, more nearly than any thing else with which we can compare it. The charcoal points were shifted, each to the opposition pole of the battery, without producing any change in the colour of the light given off by the poles respectively. Other pieces of charcoal were substituted, in the place of those with which this phenomenon was first observed, but the difference in the colour of the two images was always present, and did not seem to be connected in any manner with the particular charcoal points employed, but the yellow image was uniformly given by one pole, and the purple image by the other pole of the battery. We are under the impression that the yellow coloured image was produced from the charcoal point, in connection with the positive pole of the battery, and that the strontia coloured image came from the negative pole of the battery, though of this no note was made at the time. No attempt was made to ascertain by direct experiments whether these images possessed a different degree of power or not, in producing an impression upon an iodized plate. The difference in their colour was presumptive evidence that one image (that from the negative pole) possessed more of the chemical rays than the other. But evidence is, we are of opinion, afforded indirectly that such is the fact. The light from both charcoal points made a slight impression on the iodized plate, before they were brought so close together as to unite in forming a general blur: these two small spots or impressions are nearly opposite, or at each extremity of one diameter of the blur, and without its circumference; one of them is more distinct than the other.

Within the edge of the blur, and nearly in the same diameter with the two spots above named, there are also two impressions, darker and more strongly marked than is the general impression made by the light from the points. One of these spots is doubtless made by the light from one point, while the other is due to the light from the other point, and one of them far exceeds the other in distinctness. Now the more strongly marked spot without the blur, and the more strongly marked one within it, are close to each other on the same edge of the blur, and are doubtless produced by the light from one and the same charcoal point. The two other spots, viz. that without and that within the blur, which are much less distinct, are close to each other at the opposite extremity of the diameter of the blur, and are also evidently produced by the light from the other charcoal point.—*Silliman's Journal*.

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ART. XVIII.—*Galvanic Manufacture of Plated Goods.*

M. BELFIELD LEFEVRE has communicated to the Academy of Sciences a process by which the application of galvano-plastics is adapted to the manufacture of plated goods of copper and silver. The operation differs from gilding and silvering, for that in lieu of precipitating a thin layer of gold or of silver on a certain metal, vessels of any shape are formed of leaves of silver and copper, in which the two metals may exist in any proportion whatever. To attain this end, M. Belfield Lefevre first precipitates on a metallic surface [a plaster cast, which has been covered with black lead, will answer equally well—ED.] placed in connection with the negative pole of a voltaic arrangement, a layer of perfectly pure silver, to which any thickness that may be deemed desirable may be given, and this layer of silver is succeeded by a deposit of copper. When the copper has attained the requisite thickness, it is removed, the plated article is detached from the mould, and it will then serve, without any preparation, for photographic and probably many other purposes.—*Comptes Rendus*.

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REVIEWS.

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ART. XIX.—*Transactions of the Royal Cornwall Polytechnic Society, 1842—No. I. Thermography.* By R. HUNT, Sec.

THE art of copying engravings, or any printed characters, from paper on metallic plates, has received the title of thermography, and bids fair to produce valuable results, in a practical point of



view. In England, Mr. Hunt, the talented secretary of the Royal Cornwall Polytechnic Society, and M. Moser, on the continent, have severally devoted their attention to this interesting branch of physics; the former, in the paper before us, after detailing twenty-two experiments in reference to the subject, gives the following concise account of the process he has been led to adopt, and which, although (Mr. H. observes) far from perfect, yet affords very delicate images.

"A well polished plate of copper is rubbed over with the nitrate of mercury, and then well washed, to remove any nitrate of copper which may be formed; when quite dry a little mercury, taken up on soft leather or linen, is well rubbed over it, and the surface worked to a perfect mirror.

"The sheet to be copied is placed smoothly over the mercurial surface, and a sheet or two of soft clean paper being placed upon it, is pressed into equal contact with the metal by a piece of glass, or flat board; in this state it is allowed to remain for an hour or two. The time may be considerably shortened by applying a very gentle heat, for a few minutes, to the under surface of the plate. The heat must on no account be so great as to volatilize the mercury. The next process is to place the plate of metal in a closed box, prepared for generating the vapour of mercury. The vapour is to be slowly evolved, and in a few seconds the picture will begin to appear. The vapour of mercury attacks those parts which correspond to the white parts of the printed page or engraving, and gives a very faithful, but somewhat indistinct, image. The plate is now removed from the mercurial box, and placed into one containing iodine, to the vapour of which it is exposed for a short time: it will soon be very evident that the iodine vapour attacks those parts which are free from mercurial vapour, blackening them. Hence there results a perfectly black picture, contrasted with the grey ground formed by the mercurial vapour. The picture being formed by the vapours of mercury and iodine, is of course in the same state as a Daguerreotype picture, and is readily destroyed by rubbing. From the depth to which I find the impression made into the metal, I confidently hope to be enabled to give to these singular and beautiful productions a considerable degree of permanence, so that they may be used by engravers for working on."

The brief essay with which we have been favoured induces us to repeat what we have expressed elsewhere, that the reunions springing up, on all sides, of men of congenial intellect, and having for their object the promotion of science, not only elevate the character of those who compose them, but are silently extending a very beneficial influence towards society, by the free communication of the results which such individuals attain.

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ART. XX.—*Selecta à Prescriptis*. 8th edit. S. Highley.

WE have received a copy of this useful little book: it cannot be to review, since it has passed through seven editions, and is rapidly exhausting the eighth. We strongly recommend it, and for the benefit of those who may not have hitherto been fortunate enough to meet with it, we will state the wherefore of our approbation. It is not a mere selection of prescriptions with translations, adapted for the student alone, but in fact contains

an investigation of the genius of the Latin language, as developed in the writings of Celsus and other authors. The reproach which has hitherto attached to the peculiar dialect in which prescriptions are too often written, would be inapplicable, if the physician did but attentively study this work, and to the thousands of druggists and their assistants, whose amusement it is to criticise, and task to decypher, sundry hieroglyphics, we would recommend an attentive examination of it; it will tend no less to cultivate their taste than assist them in their daily vocation.

### ART. XXI.—*New Hydraulic Filter.*

*To the Editors of the Annals of Chymistry and Pharmacy.*

GENTLEMEN,—In your sixth number, which I have just received, amongst many others which distinguish your much wanted and very useful publication, is an article descriptive of a New Hydraulic Filter. To the pharmacist this really simple and beautiful application of a principle long known in hydraulics, and applied with the most stupendous results in the presses of Bramah, is of very great practical convenience, and for which G. M. M. is deserving of hearty thanks. To me, and doubtless to many of your provincial readers, it would be matter of difficulty to get a filter made from the given diagram, the mechanical skill requisite to make such an article being rare in the country. Perhaps G. M. M. will be good enough to state whether the filter is now made for sale, and what is the price of such a size as he describes—a very important consideration in the present bad times. With much deference I beg to submit that G. M. M. underrates the force with which the liquid is impelled through the filtering media. If through the agency of a very long lever the force applied to the piston of half an inch diameter be 1200 lbs., then the pressure on the fluid in the filter, presenting a surface of three inches diameter, will be 36 times, not 12 times 1200; circles being to each other in the duplicate ratio of their diameters. Such calculations serve to shew the capabilities of this valuable apparatus, but the application of so great a force (near 20 tons) is neither requisite nor safe.—I am, Gentlemen, your obedient servant,

Aberdare, Nov. 12, 1842.

J. J.

[We take this opportunity of stating that, in the explanation appended to the woodcut, the letters C and D should be transposed.—ED.]

| NOMINA.                              | FORMULE.                                                                 |
|--------------------------------------|--------------------------------------------------------------------------|
| <i>Arsenias Hydrargyricus</i> . . .  | $\dot{\text{Hg}}^{\text{a}} \ddot{\text{As}}_2$ . . .                    |
| — Hydrargyrosus . . .                | $\dot{\text{Hg}}_2^{\text{a}} \ddot{\text{As}}_2$ . . .                  |
| — Kalicus . . . . .                  | $\dot{\text{K}}^{\text{a}} \ddot{\text{As}}_2$ . . . . .                 |
| <i>bi Arsenias Kalicus</i> . . . . . | $\dot{\text{K}} \ddot{\text{As}}_2$ . . . . .                            |
| — — — cum aqua .                     | $\dot{\text{K}} \ddot{\text{As}}_2 + 2\dot{\text{H}}_2$ . .              |
| <i>Arsenias Lithicus</i> . . . . .   | $\dot{\text{L}}^{\text{a}} \ddot{\text{As}}_2$ . . . . .                 |
| — Magnesicus . . . . .               | $\dot{\text{Mg}}^{\text{a}} \ddot{\text{As}}_2$ . . . . .                |
| <i>bi Arsenias Magnesicus</i> . . .  | $\dot{\text{Mg}} \ddot{\text{As}}_2$ . . . . .                           |
| <i>Arsenias super Magnesicus</i> . . | $\dot{\text{Mg}}^{\text{a}} \ddot{\text{As}}_2^{\text{a}}$ . . . . .     |
|                                      | $\frac{1}{2}$ . . . . .                                                  |
| — Manganosus . . . . .               | $\dot{\text{Mn}}^{\text{a}} \ddot{\text{As}}_2$ . . . . .                |
| — Molybdicus . . . . .               | $\dot{\text{Mo}} \ddot{\text{As}}_2$ . . . . .                           |
| — Molybdosus . . . . .               | $\dot{\text{Mo}}^{\text{a}} \ddot{\text{As}}_2$ . . . . .                |
| — Natricus . . . . .                 | $\dot{\text{Na}}^{\text{a}} \ddot{\text{As}}_2$ . . . . .                |
| — — cum aqua. . .                    | $\dot{\text{Na}}^{\text{a}} \ddot{\text{As}}_2 + 24\dot{\text{H}}_2$ .   |
| — — cum aqua. . .                    | $\dot{\text{Na}}^{\text{a}} \ddot{\text{As}}_2 + 16\dot{\text{H}}_2$ .   |
| <i>bi Arsenias Natricus</i> . . . .  | $\dot{\text{Na}} \ddot{\text{As}}_2$ . . . . .                           |
| — — — cum aqua .                     | $\dot{\text{Na}} \ddot{\text{As}}_2 + 4\dot{\text{H}}_2$ . .             |
| <i>Arsenias Nicolicus</i> . . . . .  | $\dot{\text{Ni}}^{\text{a}} \ddot{\text{As}}_2$ . . . . .                |
| — sesqui Nicolicus . . .             | $\dot{\text{Ni}}^{\text{a}} \ddot{\text{As}}_2$ . . . . .                |
| — — — c. a. .                        | $\dot{\text{Ni}}^{\text{a}} \ddot{\text{As}}_2 + 18\dot{\text{H}}_2$ . . |
| — Palladosus . . . . .               | $\dot{\text{Pd}}^{\text{a}} \ddot{\text{As}}_2$ . . . . .                |
| — Platinicus . . . . .               | $\dot{\text{Pt}} \ddot{\text{As}}_2$ . . . . .                           |
| — Platinosus . . . . .               | $\dot{\text{Pt}}^{\text{a}} \ddot{\text{As}}_2$ . . . . .                |
| — Plumbicus . . . . .                | $\dot{\text{Pb}}^{\text{a}} \ddot{\text{As}}_2$ . . . . .                |
| — sesqui Plumbicus . . .             | $\dot{\text{Pb}}^{\text{a}} \ddot{\text{As}}_2$ . . . . .                |

| PONDERA ATOMORUM. |                    | PARTES CENTESIMALES. |       |                      |
|-------------------|--------------------|----------------------|-------|----------------------|
| O = 100           | H <sub>a</sub> = 1 | + E                  | — E   | H vel H <sub>a</sub> |
| 4171,73           | 334,28             | 65,48                | 34,52 |                      |
| 6703,37           | 537,15             | 78,52                | 21,48 |                      |
| 2619,92           | 209,96             | 45,03                | 54,97 |                      |
| 2030,00           | 162,67             | 29,06                | 70,94 |                      |
| 2254,96           | 180,69             | 26,16                | 63,86 | 9,98                 |
| 1800,75           | 144,30             | 20,03                | 79,97 |                      |
| 1956,79           | 156,80             | 26,41                | 73,59 |                      |
| 1698,44           | 136,10             | 15,21                | 84,79 |                      |
| 4171,93           | 334,30             | 30,96                | 69,04 |                      |
| 2085,97           | 167,15             |                      |       |                      |
| 2331,86           | 186,85             | 38,24                | 61,76 |                      |
| 2238,60           | 179,38             | 35,67                | 64,33 |                      |
| 2837,12           | 227,34             | 49,24                | 50,76 |                      |
| 2221,88           | 178,04             | 35,19                | 64,81 |                      |
| 4921,39           | 394,36             | 15,89                | 29,26 | 54,85                |
| 4021,55           | 322,25             | 19,44                | 35,81 | 44,75                |
| 1830,98           | 150,14             | 21,35                | 78,65 |                      |
| 2280,90           | 182,77             | 17,14                | 63,14 | 19,72                |
| 2379,43           | 190,67             | 39,48                | 60,52 |                      |
| 2849,11           | 228,30             | 49,45                | 50,55 |                      |
| 4873,74           | 390,54             | 28,91                | 29,55 | 41,54                |
| 2971,88           | 238,14             | 51,54                | 48,46 |                      |
| 2873,58           | 230,26             | 49,88                | 50,12 |                      |
| 4107,08           | 329,10             | 64,94                | 35,06 |                      |
| 4229,08           | 339,88             | 65,95                | 34,05 |                      |
| 5623,58           | 450,62             | 74,39                | 25,61 |                      |

| NOMINA.                                | FORMULÆ.                                        |
|----------------------------------------|-------------------------------------------------|
| <i>Arsenias</i> Rhodicus . . . . .     | $\ddot{R}_2 \ddot{As}_2$ . . . . .              |
| — Stannicus . . . . .                  | $\frac{1}{2} \ddot{Sn} \ddot{As}_2$ . . . . .   |
| — Stannosus . . . . .                  | $\ddot{Sn}^* \ddot{As}_2$ . . . . .             |
| — Stibicus . . . . .                   | $\ddot{Sb}_2 \ddot{As}_2$ . . . . .             |
| — Stronticus . . . . .                 | $\frac{1}{2} \ddot{Sr}^* \ddot{As}_2$ . . . . . |
| — Telluricus . . . . .                 | $\ddot{Te} \ddot{As}_2$ . . . . .               |
| — Thoricus . . . . .                   | $\ddot{Th}^* \ddot{As}_2$ . . . . .             |
| — Uranicus . . . . .                   | $\ddot{U}_2 \ddot{As}_2$ . . . . .              |
| — Uranosus . . . . .                   | $\frac{1}{2} \ddot{U}^* \ddot{As}_2$ . . . . .  |
| — Vanadicus . . . . .                  | $\ddot{V} \ddot{As}_2$ . . . . .                |
| — Yttricus . . . . .                   | $\ddot{Y}^* \ddot{As}_2$ . . . . .              |
| — Zincicus . . . . .                   | $\ddot{Zn}^* \ddot{As}_2$ . . . . .             |
| — Zirconicus . . . . .                 | $\ddot{Zr}_2 \ddot{As}_2$ . . . . .             |
| <i>Arsenicum</i> . . . . .             | $\frac{1}{2} \ddot{As}$ . . . . .               |
|                                        | $\ddot{As}_2$ . . . . .                         |
| <i>Arsenietum</i> Cobalti . . . . .    | $\ddot{Co} \ddot{As}$ . . . . .                 |
| <i>bi Arsenietum</i> Cobalti . . . . . | $\ddot{Co} \ddot{As}_2$ . . . . .               |
| <i>Arsenietum</i> Ferri . . . . .      | $\frac{1}{2} \ddot{Fe} \ddot{As}$ . . . . .     |
| <i>bi Arsenietum</i> Ferri . . . . .   | $\ddot{Fe} \ddot{As}_2$ . . . . .               |
| <i>Arsenietum</i> Hydrogenii . . . . . | $\frac{1}{2} \ddot{H}_2 \ddot{As}_2$ . . . . .  |

| PONDERA ATOMORUM. |                    | PARTES CENTESIMALES. |       |                      |
|-------------------|--------------------|----------------------|-------|----------------------|
| O = 100           | H <sub>2</sub> = 1 | + E                  | — E   | H vel H <sub>2</sub> |
| 7525,80           | 603,05             | 42,59                | 57,41 |                      |
| 2508,60           | 201,02             |                      |       |                      |
| 2375,38           | 190,34             | 39,87                | 60,63 |                      |
| 3110,67           | 249,26             | 58,71                | 46,29 |                      |
| 8146,06           | 652,75             | 46,97                | 58,03 |                      |
| 2715,35           | 217,58             |                      |       |                      |
| 2734,65           | 219,13             | 47,34                | 52,66 |                      |
| 2441,85           | 195,68             | 41,02                | 58,98 |                      |
| 3129,88           | 250,80             | 53,99                | 46,01 |                      |
| 15765,68          | 1263,32            | 72,60                | 27,40 |                      |
| 5255,23           | 421,11             |                      |       |                      |
| 7062,80           | 564,65             | 79,61                | 20,39 |                      |
| 2496,98           | 200,08             | 42,33                | 57,67 |                      |
| 2445,11           | 195,93             | 41,10                | 58,90 |                      |
| 2446,54           | 155,72             | 41,14                | 58,86 |                      |
| 6601,05           | 528,95             | 34,55                | 65,45 |                      |
| 2200,35           | 176,32             |                      |       |                      |
| 470,04            | 37,67              |                      |       |                      |
| 940,08            | 75,33              |                      |       |                      |
| 839,03            | 67,23              | 43,98                | 56,02 |                      |
| 1309,08           | 104,90             | 28,19                | 71,81 |                      |
| 654,54            | 52,45              |                      |       |                      |
| 809,25            | 64,85              | 41,92                | 58,08 |                      |
| 1279,29           | 102,51             | 26,52                | 73,48 |                      |
| 639,65            | 51,26              |                      |       |                      |
| 977,52            | 78,33              | 3,83                 | 96,17 |                      |

ART. XXII.—*On Balsam of Mecca.*

I OBTAINED from Constantinople some genuine balsam of Mecca, which can only be obtained there at two druggists' shops. Its price is exorbitant, one grain being charged 5 Turkish piastres = 1s. 0½d. It is of a pale yellow colour, and has the consistence of turpentine, possessing a very delicate odour. Dropped into water, it contracts to one drop, and then spreads over it like a thin film of oil. It dissolves completely in fatty and essential oils, which then assume the delicate fragrance of the balsam.

The balsam of Mecca is chiefly employed for the purpose of removing wrinkles from the face. For this purpose, it is rubbed up, as an emulsion, with the yolk of eggs and rose water, and is applied as a cosmetic.—*B. R.*

## MEETING OF THE CHYMICAL SOCIETY.

November 15, 1842.

Professor GRAHAM in the Chair.

THIS Society held the second meeting of this Session in the Rooms of the Society of Arts, Adelphi. The first paper, on the amount of caloric given out by the hydration of oil of vitriol, was so purely a matter of figures, that it would be impossible to give even a scanty report of it.

A very interesting paper, by Dr. Stenhouse, of Glasgow, was next read by the Assistant Secretary, on tannin obtained from several sources, and also on the composition of gallic acid, variously obtained; a beautiful specimen of pyrogallie acid was shewn to the members, prepared by Dr. S., whose detailed investigations on this subject will doubtless appear in the Transactions of the Society. One hint we may be allowed to communicate to the chymical manufacturer, that by the action of nitric acid on tannin from oak bark, beautiful crystals of oxalic acid have been obtained.

A paper was also read by Mr. Harrup, of the highest interest to the investigator of electrolytic action. Mr. H. has constructed a battery, composed of six small jars (about 4 ounces capacity), which he partially fills with sulphuret of potassium; in these are severally immersed six smaller porous earthenware jars (contents about 1 ounce) filled with nitric acid; *cylinders of platina only* are plunged in both solutions, and the arrangement being completed, connection was made with the usual apparatus for decomposing water and collection of the mixed gases, of which, by the apparatus now described, one cubic inch was obtained per minute. In the porous earthenware vessels, the nitric acid is deoxidised, deutoxide of nitrogen being given off, whilst in the outer jar the sulphuret of potassium is oxidised, being found to consist of sulphate, sulphite, and hyposulphite of potash. Electrolytic effects, not so powerful, but similar, were obtained by charging the outer vessel with a solution of sulphate of protoxide of iron, whilst the inner vessel was excited by a solution of sulphate of peroxide of iron, the action continuing until both solutions approximated to like states of oxidisment. The theoretical views deduced from these experiments were clearly explained by Mr. H., but as we should not be doing justice to the talented investigator if we narrated them in other than his own language, we must refer our readers to the Transactions, which will be shortly published, for further details.

Some correlative experiments with salts in a state of fusion, giving rise to temporary electrolytic action, were mentioned, at the suggestion of the President, by Mr. Solly, jun., who promises at a future time to continue them.

Dr. Fyfe, of Edinburgh, having been duly elected a member, the President moved the adjournment of the meeting in the usual manner.

\* \* \* *Communications, Books for Review, &c. are requested to be addressed*—“To the Editors of the ANNALS OF CHYMISTRY, care of Messrs. Longman, Brown, and Co. Paternoster Row.”

WILSON AND OGLIVY, 57, SKINNER STREET, SNOWHILL, LONDON.

THE  
ANNALS OF CHYMISTRY  
AND  
PRACTICAL PHARMACY.

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No. 9.] FRIDAY, NOVEMBER 25, 1842. [VOL. I.

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A DRUGGISTS' CHARTER.

THE apophthegm of the Hebrew sage, "there is nothing new under the sun," is more frequently quoted than understood. It does not point to novelty in details, but in principles; for while, in the former, it is of every-day occurrence, in the latter it is almost impossible. The mightiest oak that overshadows the plain is but the development of an acorn; and the last invention which astonishes the world is often but the realization of some principle which has been known since man began to reflect. To the unthinking, however, every variety of detail seems an alteration of principle; and they gape with uneasy stupefaction on those changes which are absolutely forced upon us by time, which, according to BACON, is the greatest of innovators. When LINACRE gathered the physicians of England into a college, and gave them a home and a rallying place, he must have startled many a grave citizen. But what must have been the surprise of each *laudator temporis acti* when the barber-surgeons threw off their shackles, and expanded into independent practitioners? What must have been the astonishment even of acute observers, when the apothecaries, in spite of verdicts and denunciations, in spite of both the spirit and letter of the law, began to practise physic with impunity, under cover of a judgment of the House of Lords; and, destined to look down in future on

Green earthen-pots, bladders, and musty seeds,  
Remnants of packthread, and old cakes of roses,

became the physicians of the middle classes! Yet all these changes were long in preparation, like the flower more than half



matured in the earth, before it appears above the surface. Physicians must have desired the establishment of a college before the days of LINACRE ; it was obviously requisite that surgeons should break their ignoble alliance with barbers ; and the wants of society had created the practising apothecary before the class was recognised by the House of Lords. Another epoch has now arrived: The apothecaries, however numerous, are scarcely numerous enough, or, at any rate, sufficiently cheap, to supply the wants of a host of customers. Hence a practice has sprung up, which is blamed, threatened, and connived at, and which, in spite of its zealous adversaries, will probably spread more and more: we mean, the counter-practice of druggists. Most people would like to have the best advice which the market affords ; most people would like to consult one of her Majesty's physicians ; but, alas ! their fee is one pound one, and most people's purse does not contain the required sum ! Hence we must have practitioners whose remuneration tallies with the slenderest income ; and thousands are but too thankful to the druggist, whose black draught includes advice, and costs but sixpence. Should Parliament one of these days add its sanction to the custom of society, and legalize counter-practice, it is probable that the grant of this privilege would be accompanied by reservations and restrictions. Let us consider what these might probably be. In the first place a real and searching supervision of druggists' shops would be insisted on. Whatever the theory may be, practically speaking their shops are free from inspection. The honest and the honourable, indeed, are far from taking advantage of this relaxation of discipline, and their drugs may challenge the competition of Europe ; but the few adulterators who meanly defraud the public at once of their money and their health, bring undeserved discredit on the whole profession, and should be checked by the wholesome severity of the law.

The committee for the examination of drugs should be composed of an equal number of members selected from the College of Physicians, and from the great body of chymists and druggists.

A board of similar constitution might examine candidates for a license to practise pharmacy, with or without the privilege of counter-practice.

Those who passed the examination with great credit might be styled masters in pharmacy; and we have no doubt that many druggists in actual practice would present themselves for examination, with the hope of obtaining this honourable distinction.

Those who begin practice as druggists, after the expiration of three years from the passing of the act, should be bound to present themselves to the board; and, if they desire the privilege of counter-practice, they should show, to the satisfaction of the board, that they have enjoyed opportunities of learning the treatment of those ailments which form the bulk of counter-practice.

Those who presented themselves with the intention of obtaining a license as assistants only, would, of course, pay a smaller fee, and undergo a less stringent examination.

The druggist who had passed such an ordeal, and was stamped as a master in pharmacy, would promise to compound prescriptions faithfully for licensed physicians and surgeons; he would also readily pledge himself to employ none but educated assistants. To promise these things would be little; but there is another pledge, almost too much for frail human nature, especially in country towns, to bear; yet we hope that, under an improved state of things, even this might be borne: we mean a pledge to abstain from selling secret remedies. Some would suppose, indeed, that this might be interdicted by law to the chartered druggist, as it is to the French *pharmacien*; but the current of quackery sets so strong in England, the love of infallible elixirs is so ardent in this country, that it might be difficult at the present moment even to enact such a law. Indeed, while government participates in the shameful gains of the quack-medicine vender, how can it scare away the druggist from the traffic which it sanctions?

The chief objection, however, to the proposed charter would come from the apothecaries, who would allege that the legalization of counter-practice would be an encouragement to empiricism, and a violation of their rights. To this it might be answered, first, that a public and responsible empiricism is far better than the other resources to which the indigent are often driven—such as patent medicines, the routine of my Lady Bountiful, and the attempts of *dilettanti*, practising from popular

treatises ; secondly, that the examination would take the roughness off this style of practice, and make it more compatible with the common weal ; and, lastly, as an *argumentum ad homines*, it might be asked, are not the druggists, under Queen Victoria, in the same position as the apothecaries under Queen Anne ?

## CHYMISTRY, OPERATIVE AND EXPERIMENTAL.

### ART. II.—*Hydrogen announced to be a Metal.* By M. DUMAS.

AT the termination of his fourth lecture at the Sorbonne—the subject being hydrogen—M. Dumas announced the following striking views :—“ Whatever it may cost me, gentlemen, in thus giving my opinion, I ought to express it fully. We ought no longer to consider hydrogen as a metalloid, or as merely approaching to a metal in any form—it ought to be classed by the side of metals, or among metals. *It is a gaseous metal, even as mercury is a liquid metal.* If we suppose that it is impossible to liquify the vapour of mercury—that it is colourless, inodorous, and transparent as hydrogen—we shall have a correct idea of the views I wish to establish. By degrees you will learn to appreciate the correctness of this new theory—when, for instance, you study the different compound bodies of which hydrogen is a constituent. The *ensemble* of its properties approaches, in fact, to mercury and potassium.”—*Echo du Monde Savant*, Nov. 20, 1842.

### ART. III.—*Manufacture of Muriatic Acid.*

ACCORDING to Winckler, pure muriatic acid may be advantageously manufactured in the following manner :—Twenty-four parts (by weight) of pure and perfectly dry chloride of sodium are placed in a tubulated retort, which ought not to be filled to more than one-fourth with the mixture, and over this should be poured 44 parts (by weight) of English sulphuric acid, 1·830 specific gravity, diluted with 7 parts (by weight) of water ; these two latter to be previously mixed and allowed to cool before being added. To the retort a rectangularly bent glass tube, which ought to be of considerable length (assuming the above parts as ounces, it should be at least three feet in length, and of half an inch bore) is then adapted by means of sheet Indian rubber, the exterior limb opening into the bottom of a rather high than wide glass vessel, containing 20 parts of water, capable of filling it to two-thirds of its height. The mouth of this glass vessel ought to be well closed by the tube, and the vessel should be surrounded with cold water. The mixture is then exposed to a

degree of heat which causes it to boil rapidly ; this is kept up as long as the bubbles, slowly following each other, prove that muriatic acid is still present, and until the sulphate of soda begins to flow smoothly and without foaming. The liquid should be then removed, in order to prevent the bursting of the vessel, which frequently takes place during the cooling of the bisulphate of soda. If the operation has been carefully performed, the muriatic acid obtained amounts to about 44 ounces, and contains 30 per cent by weight of anhydrous muriatic acid. The glass tube ought to be placed as sloping as possible, in order to condense therein the whole of the evaporating water, and to carry it back into the retort.

A beautiful crystallised sulphate of soda may be obtained as an extra product, by decanting the residuary liquid into a proper earthen vessel, rather high than wide. The film of salt forming on the surface is to be removed after standing for some time, and that portion of salt still in the fluid state, carefully decanted, when the inside will be found covered with large crystals, frequently of the length of an inch, and of one-fourth of an inch in diameter, which, after completely cooling, may be easily removed, and kept for a long time without change, if preserved in well-closed glass vessels.—*Jahrb. f. Pract. Pharm.*

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#### ART. IV.—*Manufacture of Creasote.*

SIMON has given the following simplification of the process for manufacturing creasote, which is, nevertheless, essentially that of Reichenbach :—A copper still, capable of containing eighty Berlin quarts, is filled to one-third with the oil of wood-tar, and distilled. First, the more volatile matters pass over. These do not contain creasote, and are, therefore, to be rejected ; but when, by the gradually increased temperature, there passes over a very acid fluid, which becomes turbid, and at the same time an oil separates therefrom when mixed with water, the product must be collected, and the distillation continued until the operator notices a squirting in the still, when the process is interrupted. The distilled product is then nearly saturated with potassa, returned to the still, which must have been previously cleansed, and should be now half filled with water, when distillation must be recommenced. At first an oil comes over, which floats on water, and which consists chiefly of eupione, for which reason it is useless for preparing creasote. As soon, however, as the oil begins to sink in the water which comes over with it, it is charged with creasote, and should be carefully collected. The distilling aqueous fluid should be re-introduced, from time to time, into the still, and the distillation continued so long as any oil continues to come over with it.

This is entirely Reichenbach's method so far modified by Simon, who uses a metallic vessel. The distilled oily fluid is now dissolved in Liquor Potassæ, sp. gr. 1.120. That which remains undissolved is eupione, and must be skimmed off. The solution of creasote in potassa contains, however, a considerable portion of eupione, which dissolves therein. The greater portion of this may be separated by dilution, and distilling with an equal quantity or five-fourths of its volume of water, pure water being added from time to time so long as any eupione comes over with the distilled liquor. When eupione has ceased to pass over, sulphuric acid is poured into the still in quantity exactly sufficient to saturate one-third of the potassa employed, and the distillation is then renewed. Creasote then distils, the first portions of which, however, still contain eupione, after which pure creasote follows; that is to say, "a creasote which, when mixed with six or eight times its quantity of a solution of pure potassa, furnishes a mixture which, by the addition of any further quantity whatever of water, does not become turbid." The combination of creasote remaining in the still is now mixed with sulphuric acid in slight excess, and the distillation renewed; the water coming over at the same time is from time to time returned into the still; and when no further oil passes over with the water, the process is complete. The creasote thus obtained is redistilled with the water which has passed over with it, whilst the distilled water is, meanwhile, from time to time poured back into the still. The creasote thus obtained is then colourless; but it contains a considerable quantity of water in solution, which is separated by distillation in a glass-retort. The water distils first, and then creasote, which, after cleaning the neck of the retort from the water, must be received in another dry receiver. If the creasote assumes a red colour after being exposed for some time to the air, it must be redistilled, and then it keeps very well.

Korne found that tar prepared from turf furnishes much more creasote than that from fir-wood, &c. &c.—*Berzelius' Lehrbuch*, 4th edit. Band. 8, S. 564.

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ART. V.—*On the Preparation of Iodide of Potassium; being a Digest of the Treatise on the above Preparation, which gained the Prize of the Hagen Bucholzian Foundation.* By OTTO EDER.

[Continued from page 255.]

IN order to obtain decisive proof of the existence of sulphuret of potassium by experiment, some iodide of sulphur was prepared and dissolved with more iodine in a ley of caustic potassa, until the latter assumed a yellowish colour. The iodate of potassa thus disengaged was mixed with sulphur, which almost leads to

the inference that the combination of iodide of sulphur with iodate of potassa is invariable. The residuary salt, obtained after evaporation of the ley, was digested with alcohol, in order to remove all the iodate, and with a view to obtain an analogous salt, from the iodide of potassium prepared by means of sulphuret of potassa (*hepar sulphuris*.) After evaporating the solution, there remained a saline residue, which was neutral, easily and perfectly soluble in water, and possessing a disagreeable alliaceous smell; in short, similar properties to the salt above described, and obtained from sulphuret of potassa. Neither did the solution indicate traces of sulphuric acid with chloride of barium, which, however, occurred after the salt had been heated to redness.

*Preparation by Dissolving the Iodine in a Ley of Caustic Potassa, according to the Pharmac. Boruss.*—That by following this prescription no perfect product can be obtained has, indeed, been already sufficiently proved, especially by Dr. Herzog (*Pharm. Centr. Bl.* p. 353). The following experiments were, however, repeated, for the sake of completely setting the question at rest:—For this purpose, in a ley of caustic potassa recently prepared, and perfectly free from carbonate, iodine was dissolved until the liquor assumed a yellow colour in consequence of the presence of this latter in excess. The liquor, when evaporated to dryness, left an almost white residue, which was neutral, and did not at all effervesce on the addition of acids. One-half of it was then very carefully exposed to a slightly glowing red heat, in a small retort, until the mass, which at first is bubbling or frothy, began to flow smoothly. The other half of the residuary salt was also heated to redness, with all possible care, in a covered platina crucible. On the cover of the platina crucible a slight tinge of iodine had deposited, and the sides of the retort were, at the conclusion of the experiments, in the same manner covered with a white substance, proving that the heat employed had been strong enough to effect the decomposition of the iodate.

Both residua obtained by red heating, when dissolved in water, gave feeble alkaline reactions. Dissolved in alcohol, they rendered the solution slightly turbid; and when the supernatant liquid became clear, there appeared at the bottom of the vessel a deposit, slight indeed, but which, washed with alcohol, and dissolved in water, was tested by reagents, and proved to be iodate of potassa. There likewise appeared a yellow colour in solutions of iodide of potassium prepared in the above manner, on the appearance of acetic, dilute, sulphuric, and muriatic acids, although not immediately, yet after a short time, whilst a solution of pure iodide of potassium, not more concentrated, remained unchanged on the addition of these acids.

In the following experiment, when a ley of caustic potassa, perfectly free from carbonate, was again employed, the greater part of the iodate of potassa was separated, during crystallisation, from the iodide of potassium which had formed. The disengaged iodate of potassa was perfectly neutral. A portion of it, when decomposed in a platina crucible, left a feebly alkaline salt, which, dissolved in water, assumed, on the addition of acetic acid, a yellow colour from the iodic acid, which had not been perfectly removed. The same result was obtained when another portion of iodate of potassa was submitted to decomposition in a retort, to which a pneumatic tube was adapted, the evolved oxygen being collected over water. This salt, previously heated to redness, was again exposed to a constant heat in a covered platina crucible, when a considerable loss, by the evolution of white fumes of iodide of potassium, was sustained. Iodide of potassium thus obtained, although free from iodate, gave a strong alkaline reaction.

We ascertained that iodide of potassium, prepared according to this method, is always alkaline, even if a ley of caustic potassa, perfectly free from carbonate, has been employed; and this occurs from the evolution of iodine which takes place when the salt is exposed to a red heat. It is probable that the iodate is partially decomposed into its elements sooner than potassa, and that a portion of the iodine thus escapes with the evolved oxygen. Hornemann (in the *Pharm. C. Bl.* 1838, p. 119,) is inclined to think that an evolution of iodine alone might take place when a ley of caustic potassa, containing carbonate, is employed, whereby bicarbonate of potassa is formed in the solution of iodine, which is required for the evolution of the same metal. This, however, is not the case, as may be readily ascertained if some neutral iodate of potassa be heated to redness in a glass-tube, closed at the inferior extremity by fusion, and at the upper part with starch-paste, when the latter will speedily assume a dark-blue, and even black, colour, by the iodine which is freed. Pure iodide of potassium, treated in the same manner, does not produce any change in the paste; and this salt also preserves its neutral condition after being heated to redness.

Four ounces of iodine were dissolved in 5 ounces 6 drachms of a ley of caustic potassa 1.33 sp. gr.: the greater part of the iodate of potassa was separated from the brown-coloured liquor by crystallization, and exposed to a red heat in a common phial placed in a crucible, and surrounded with sand, until the contents began to fuse. The rest of the ley, after being evaporated to dryness, was treated in the same manner. Both residua were heated to redness, and then dissolved in water, and allowed to crystallize. They yielded  $4\frac{1}{2}$  ounces and 27 grains of iodide of potassium, possessing the characteristic property of the prepara-

tions containing iodate of potassa, and assuming a yellow colour on the addition of dilute acids\*. It likewise indicated an alkaline reaction, although the salt, previous to ignition, was neutral. The crystals, when exposed to the atmosphere, absorbed moisture, whilst a quantity of iodide of potassium placed beside them remained unchanged. According to this process the price of a pound of iodide of potassium would amount to six shillings and five pence, exclusive of labour.

6. *By dissolving Iodine in a Ley of Caustic Potassa, and decomposing the solution by means of sulphuretted hydrogen.*—This method, suggested by Turner, and adopted by the Hanoverian Pharmacopœia, is certainly one of the most judicious, since, when the operation is executed with a moderate degree of precision, a very slight, if any, loss will be sustained. One inconvenience is, however, connected with this method, viz. that the salt obtained is always contaminated with sulphuric acid, which seems to be formed by the action of the sulphuretted hydrogen gas on the iodic acid; for when a ley, absolutely free from sulphuric acid, and saturated with iodine, was decomposed by means of sulphuretted hydrogen gas previously washed, a salt was obtained which, notwithstanding the precaution observed, contained traces of sulphuric acid. The preparation thus obtained is certainly *sufficiently pure for medical use*†, since the presence of some traces of sulphate of potassa cannot certainly cause any detrimental effects. On a closer examination of this method, in respect to its economy,  $1\frac{1}{2}$  ounces of iodine were, with the assistance of a gentle heat, mixed with 2 ounces of a ley of caustic potassa of 1.33 sp. gr. The solution, which had assumed a brown colour in consequence of iodine present in excess, was then diluted with 24 ounces of water, which perfectly dissolved the disengaged iodate of potassa. A constant stream of sulphuretted hydrogen gas was then introduced into this solution, which soon caused the liquor to become turbid, owing to the disengagement of sulphur. The liquor, which, after twenty-four hours had elapsed, still preserved a distinct odour of sulphuretted hydrogen, was then filtered, evaporated, and set aside to crystallize, by which process a neutral iodide of potassium was at last obtained. The proceeds thus obtained amounted to 1 ounce 7 drachms 29 grains. Another experiment, conducted in the same manner, with the single exception that 3 ounces of iodine and 4 ounces of the ley of caustic potassa were used, gave a product of iodide of potassium amounting to

\* Müller ascertained that iodide of potassium, containing only 1-60,000 of iodate of potassa, when diluted to 15,000 times, gave a yellow tinge barely perceptible on the addition of a dilute acid.—*Jour. für prakt. Chem.*

† See article *Purity of Medicines*, page 67; this being an example where the phrase is admissible.



3 ounces 7 drachms. Calculating the expense of the materials consumed, one pound of iodide of potassium, manufactured in this way, would cost five shillings and sixpence. The price of the caustic potassa was calculated from two operations, in one of which eight pounds of Liq. Potassæ, of 1.33 specific gravity, were obtained from six pounds of carbonate of potassa; and in the other the same quantity of carbonate of potassa yielded seven pounds eleven ounces.

[To be continued.]

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ART. VI.—*Test for Copper.*

VERGUIN observed, by chance, that copper may be disengaged, in the metallic state, from any solution containing it, by feebly acidulating the liquid with muriatic acid, and placing it in a capsule formed with platina foil: over this must be arranged a piece of tin plate in such a manner as to touch both the liquid and platina. A deposit of metallic copper on the surface of the platina ensues, which is firmly adherent, and maintains its metallic lustre. The metals should be perfectly clean.—*Ph. C. Bl.*

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ART. VII.—*Particulars of some new Organic Bases produced by the action of Sulphuretted Hydrogen Gas on Combinations of Carburetted Hydrogen with Subnitrates.* By N. N. ZININ, (Bullet. Scientif. de St. Petersbourg, I. No. 18.)

LAURENT showed that by the action of nitric acid on Naphthalin, first, a combination is produced, crystallising in thin yellow needles, which he termed Nitronaphtalase. This is scarcely soluble in water, but dissolves very easily in alcohol and ether. If sulphuretted hydrogen is conducted through the alcoholic solution, kept warm, the liquor will assume a reddish-green colour, with a yellow tinge; crystals of sulphur are deposited, and by removal of the spirit of wine, a thick dirty green oil is obtained, which forms a crystalline mass, together with a liquor from which similar crystals are deposited. These crystals are the new body termed by Zinin *Napthalidam*. It may be obtained still more easily by placing one part of nitronaphtalase in about ten parts of concentrated alcohol, saturating the liquid with ammonia, and then treating with sulphuretted hydrogen. The sulphur is separated by repeated distillation, and thus the napthalidam is obtained. Napthalidam is a powerful organic base, which combines with all the hydrogen and oxygen acids. It forms delicate white, flat compressed needles, which are of a silky lustre, and at 122° it melts, and boils at 572° F., when the base distils over undecomposed. If, therefore, napthalidam, procured by the just

now stated formula, is impure, it may be purified by distillation. It easily distills, and passes into the receiver in the form of a clear slightly yellow liquor. A single drop of this liquor remains sometimes for a long time in the fluid state, but instantly becomes solid when disturbed, or at a temperature of  $32^{\circ}$ . Exposed to the air for some time, it assumes a violet colour, probably absorbing hydrogen, wherefore it must be kept in hermetically-closed vessels. It has a peculiarly strong disagreeable odour, and a bitter pungent taste. It does not dissolve in water, but easily in alcohol and ether. It has no alkaline reaction: it may easily be disengaged from its salts by ammonia, heated on platina. It burns with a yellow smoking flame, leaving a good deal of carbon. It combines with all acids, forming white salts, which crystallize with facility. Those formed with oxygen acids contain one atom of water, which cannot be disengaged without destroying the salts, whilst those formed with hydrogen acids are free from water. With chloride of platina naphthalidam forms a double salt; with chloride of quicksilver the same: and it seems also to enter into combination with iodine.

Its composition is  $20\text{ C} + 18\text{ H} + 2\text{ N}$ . Naphthalidam is therefore a base, free from oxygen.

The sulphate consists of  $20\text{ C} + 20\text{ H} + 2\text{ N} + \text{S} + 4\text{ O}$ , containing, therefore, 1 eq. of base,  $\frac{1}{2}$  eq.  $\text{S}$ , and 1 eq. of water, analogous to the composition of the salts of the other organic bases.

The muriate of naphthalidam consists of  $20\text{ C} + 20\text{ H} + 2\text{ N} + 2\text{ Cl}$ ., or 1 eq. of base and 1 eq. of muriatic acid. With oxalic acid it yields two salts; one of which contains 1, the other 2 eq. of oxalic acid; each of them contains 2 eq. of water.

The nitrate of naphthalidam crystallizes with facility in small glittering laminæ. Very concentrated nitric acid decomposes it into a brown powder, which dissolves in spirit of wine, producing a red colour. The brown powder can be recovered by evaporation, but it frequently occurs that crystals are simultaneously formed of the colour of the rose-chaser (brass beetle, Spanish fly) resembling murexide. These remain with the brown powder.

*Benzidam*.—If an alcoholic solution of nitrobenzide, after being purified by distillation, is saturated with ammonia, and the liquor then treated with sulphuretted hydrogen, it first deposits crystals of sulphur, and afterwards, on standing for a long time, and being exposed to a temperature of  $32^{\circ}\text{ F}$ ., becomes solid, and is entirely converted into a mass of yellow needles, possessing an acrid and pungent taste, easily soluble in alcohol and water. This substance is termed by Zinin *benzidam*. It consists of  $12\text{ C} + 14\text{ H} + 2\text{ N}$ . It would be, however, superfluous to detail its properties, since J. Fritsche, of Petersburg, observes, in a

postscript to this treatise, that benzidam is nothing else than *amilin*—one of the many products which he obtained during his laborious investigation of the constituents of indigo.

[The editors of the ANNALS are deeply indebted to Herr Ulex, an eminent pharmaceutical chymist, established at Hamburg, for the preceding succinct abridgment of M. Zinin's paper, besides several original articles to which Herr U.'s name will be found attached.]

ART. VIII.—*Some Remarks on Capaun's Process for procuring Hyposulphite Soda.*—(See Annals, p. 37.)

(Original communication.)

A DILUTE solution of caustic soda is incapable of dissolving sulphur: it must be pretty concentrated. If hydrosulphuric acid gas is allowed to pass through a solution of  $\text{Na S}_2$ , this salt is decomposed. Three atoms of sulphur are precipitated, and the remaining atom of sulphur combines with the  $\text{SO}_2$ , forming an hyposulphite,  $\text{Na S}_2 + \text{SO}_2 + \text{H}_2\text{O} = \text{Na O S}_4\text{O}_2 + \text{SH}_2 + \text{S}_2$ . It is, therefore, necessary to dissolve two atoms of sulphur in a solution, containing one atom of caustic soda. By the reaction of the hydrosulphurous acid gas upon hydrogen gas, there is always some sulphur precipitated,  $\text{SO}_2 + 2\text{SH}_2 = 2\text{S} + 2\text{H}_2\text{O}$ . Practice verifies the accuracy of these proportions.

ULEX.

ART. IX.—*Detection of Potato Starch.*—(See Annals, p. 5.)

POTATO starch is more easily detected in arrow-root by hydrochloric acid. Mixed therewith, genuine arrow-root gives no odour whatever; adulterated with potato-starch, a smell of fresh beans or rushes may be perceived.

ULEX.

## CHYMISTRY APPLIED TO AGRICULTURE.

ART. X.—*Researches on the Decomposition of Wood.* By  
R. HERMANN.

LIGNEOUS matter undergoes different kinds of decomposition; one occurs when free access of atmospheric air is denied, more especially when wood remains for a long time covered with water or heavy layers of earth. Under these circumstances, an evolution of water, carbonic acid, and marsh gas, ensues, whilst the wood is converted into turf and peat.

Another kind of decomposition takes place when wood exposed to the free access of atmospheric air undergoes decompo-

sition, being simultaneously subjected to the action of a certain temperature and humidity: it is then changed into humus: wherefore this sort of decomposition may be distinguished by the term humic decomposition.

I shall, continues M. Hermann, direct my attention exclusively to that species of humic putrefaction with the properties of which De Saussure has hitherto been occupied. He found that moist wood-shavings left the volume of air unchanged, absorbing, however, a certain quantity of its oxygen, and giving out, in return, an equal volume of carbonic acid; at the same time the weight of the wood decreased, and it was converted into a friable mass, containing more carbon than the fresh wood; which clearly proved that wood undergoing decomposition not only loses a portion of its carbon in the form of carbonic acid, but a still greater portion of its elements in the form of water.

Liebig expresses the proportions of these constituents by the following formula:—

|                        |                                                  |
|------------------------|--------------------------------------------------|
| $C_{36} H_{44} O_{22}$ | oak timber, according to Gay Lussac and Thenard. |
| $C_{23} H_{40} O_{20}$ | humus from oak timber, according to Mayer.       |
| $C_{24} H_{36} O_{18}$ | ditto ditto, according to Dr. Will.              |

Wood therefore would lose by humic decomposition, for each atom of carbon escaping as carbonic acid, 2 eq. of hydrogen, oxidated at the expense of the oxygen of the atmosphere.

The actual changes are, however, not so simple as this, and have been overlooked.

1st. During the decomposition of wood, not only oxygen gas, but azote also, is absorbed from the air.

2d. Ammonia is formed at the same time.

3d. Likewise not only is humic acid formed, but also humus, extractive, and nitroliu.

Mulder had previously found ammonia in many of these substances: he, however, supposed it to be derived from the air by the mouldering substances. Hermann now proves, by experiment (that is to say, by exposing to the influence of a proper quantity of air over quicksilver in a glass bell a certain quantity of wood in which the process of decomposition had already commenced), that 1 volume of azote and 2 volumes of oxygen gas are absorbed from the air, and replaced by 4 volumes of carbonic acid gas.

If the completely decomposed wood, still containing nitroliu, is treated in a similar manner, it assumes from the air 3.5 of azote and 27.8 of oxygen, replacing them by 27.0 of carbonic acid gas.

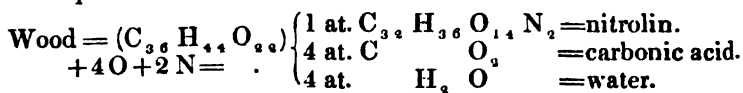
That ammonia is contained in the mouldering substances may be easily verified by moistening them with caustic potassa, and bringing a glass rod, dipped in muriatic acid, near to the mix-

ture, when white fumes of sal ammoniac are produced. Spring water in contact with strata of mould, or turf, commonly contain ammonia; *this might explain the frequently occurring fact of distilled water containing ammonia.*

[Ammonia is of the greatest importance in vegetation; wherefore, in the wisely-constructed economy of Nature, it is everywhere produced in sufficient quantity for the preservation and support of the life of plants, and through them of animals also. This explains the production of ammonia on the formation of humus.]

The quantity of ammonia varies exceedingly in decayed wood and turf; in decayed wood its maximum amounts to 1 per cent.

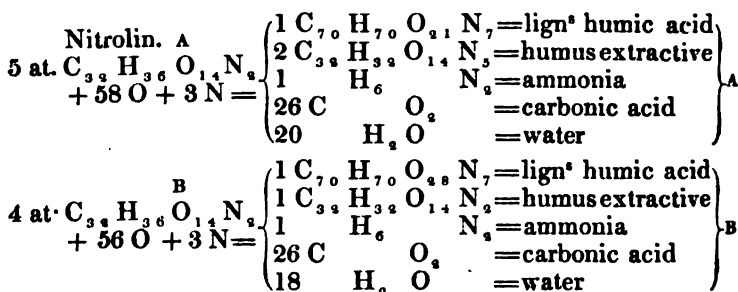
During the putrefaction of wood not only humic acid is formed, but, as above stated, nitrolin and humus extractive also; nitrolin being first formed during decomposition, and afterwards ligneous humus from the nitrolin. The decomposition therefore takes place as follows:—



From 1 at. of wood, therefore, by the assimilation of 4 at. of O and 2 at. of N, 1 at. of nitrolin, 4 at. of carbonic acid, and 4 at. of water, are formed:

The theory of the formation of humus\* becomes more complex in proportion as its composition is varied. In one case it was found to consist of 1 at. of ligneous humic acid, 2 at. of humus extractive, and 1 at. of ammonia: in the other, of 1 at. of ligneous humic acid, 1 at. of humus extractive, and 1 at. of ammonia.

Nitrolin, therefore, when undergoing decomposition, either produces equal parts of ligneous humic (B) acid and humus extractive, or 1 at. of the former, with 2 at. of the latter (A).



[To be continued.]

\* By ligneous humus must be understood that portion of decomposed woody matter which dissolves in alkalis.

## PRACTICAL PHARMACY.

ART. IX.—*On Ioduret of Arsenic.* By H. WACKENRODER.

AMONG the number of medicines which have either been simply recommended for use or really tried, is the iodide of arsenic. Without entering into a critical examination as to whether an essential service is practically rendered to medical science by this abundance of remedies, especially of chymical preparations obtained from the mineral kingdom, I freely accord to medical science that right of freely experimenting in medicine, even as we ourselves claim the same in chymistry. For ourselves we have only to take care that we furnish the preparations required by medical men at our hands in a uniform condition, lest very dissimilar remedies, as was the case with several ancient preparations—one instance of which is Kermes mineral—should be submitted for the use of the physician under one and the same name. The more violently remedies act on the animal economy, the more they approach to what are properly termed poisons, and the more necessary is it to ascertain a method of preparing them which allows the dose of such remedies to be estimated with the greatest precision. This is the reason which induced me to furnish the following remarks on the periodide of arsenic ( $= A_3 \cdot I^6$ ), which corresponds in composition (that is,  $A_3 \cdot O^3$ ) with arsenious acid.

This powerful remedy seems to have been already employed by several in medical practice. Biett has used it in the form of ointment in cases of tuberculous corroding scabies\*. The ointment was composed of 1 ounce of hog's lard, and 3 grains of iodide of arsenic. Magendie† recommends us, in order to prepare this latter, to sublime 16 grains of metallic arsenic with 100 grains of iodine, or to boil 30 grammes ( $= 463.02$  grains) of pulverized arsenic and 100 grammes ( $= 1543.4$  grains) of iodine with 1000 grammes ( $= 15,434$  grains) of water, filtering and evaporating to dryness.

For internal administration of the iodide of arsenic, Donovan has suggested a combination of the same with iodide of quicksilver, viz.

R. Liq. Hydriodati Arsenici et Hydrargyri, ℥ij.; Aq. Destillatæ, ℥iij.; Syr. Zingiberis, ℥ss. M. divide in parts eq. iv. (Each of these parts contains  $\frac{1}{16}$  grain of arsenic,  $\frac{1}{8}$  grain of quicksilver, and  $\frac{1}{8}$  grain of iodine).

The hydriodate of arsenic and mercury, according to his direction, is to be prepared by rubbing together 6.08 grains of finely pulverized metallic arsenic and 15.38 grains of quicksilver

\* See Pharm. Universalis, by Jourdan, t. ii. p. 11.

† Ibid.

with 50 grains of iodine, with the addition of 1 drachm of alcohol, until the mass, at first dark-brown, has become of a pale-red, and dry. Eight ounces of water are then to be added, together with 1 drachm of hydriodic acid (containing 2 grains of iodine), and the whole mass boiled for some minutes in a flask. The weight of the liquor obtained after cooling should amount exactly to *eight* ounces. Donovan thinks that this solution contains, in *one* drachm,  $\frac{1}{4}$  of a grain of arsenious acid ( $= \text{As}^2 \text{O}^3$ ),  $\frac{1}{4}$  of a grain of protoxide of quicksilver, and  $\frac{3}{4}$  of a grain of iodine, as hydriodic acid. As it is not, however, stated whether Donovan really employed this preparation, his statements have but slight interest for the physician, and still less for the pharmacist. Such combinations may easily, but without any advantage, be infinitely multiplied.

Of greater importance is the statement of Dr. Crane, of Canterbury. This physician relates that he has employed the iodide of arsenic internally, as a remedy for scirrhus mammæ, produced by a blow on the breast of a woman, with perfectly satisfactory results. Dr. Crane employed the iodide of arsenic prepared in the manner recommended by Dr. A. T. Thomson: whence it appears probable that this remedy has been frequently employed by English physicians. The iodide of arsenic was administered for eight successive months in the dose of from  $\frac{1}{17}$  to  $\frac{1}{4}$  of a grain.

This observation induced one of my colleagues, Professor Haeser, to try this remedy in a similar case of swelling of the glands; and I was requested to give a proper formula for it.

As the officinal cobalt is not, generally speaking, free from foreign metals, the first step was to sublime a sufficient quantity over the spirit-lamp, in a rectangularly-bent glass-tube.

One grain of the finely powdered sublimed arsenic, accurately weighed together with 6 grains of pure iodine, were then placed in a digester, and infused with about 2 drachms of water. The quantity of iodine exceeds, in this case, by one-sixth the stoichiometrical proportion for forming the  $\text{As}^2 \text{I}^6$ . This excess is, however, intentional, for the purpose of effecting the complete solution of the arsenic during the moderate digestion, which is continued for about an hour. The solution, which was of a brownish colour from excess of iodine, was then submitted to an extremely gentle evaporation in a small porcelain basin, until a crystalline salt, of the colour of red lead, was left behind. The evaporation must be conducted with great care, lest periodide of arsenic be volatilized in white fumes, together with the free iodine. As soon as the residue begins to solidify, a temperature of  $30^\circ \text{C.} = 86^\circ \text{F.}$  must not be exceeded; for which purpose the oil-lamp formerly described by me is very appropriate. It is best to allow the final residua of humidity and free iodine

to evaporate spontaneously at a moderate temperature, during which time the basin should be loosely covered with a plate of glass. During the evaporation white shining crystalliform laminæ generally separate from the liquor; these, however, cannot be distinguished in the dry salt. They are likewise formed, if the salt, before being rendered perfectly dry, is washed on a filter with a little water. They consist, according to Plisson\*, of arsenious acid ( $\text{As}^{\circ} \text{O}^3$ ), iodide of arsenic, and water.

The dry light-red salt, dissolved in six ounces of pure water, forms a clear colourless liquid, which remains unchanged in contact with the atmosphere. One drachm of it contains  $\frac{1}{17}$  of a grain of metallic arsenic, and  $\frac{1}{17}$  or nearly  $\frac{1}{16}$  of a grain of iodine.

This liquor periodidi arsenici has a strong acid reaction. Lime-water, as well as chloride of calcium with ammonia, produce, when in a dilute state, scarcely any change therein. Chloride of calcium with lime-water, on the contrary, produces a precipitate of arsenite ( $\text{As}^{\circ} \text{O}^3$ ) of lime. Sulphate of copper with potassa does not distinctly indicate arsenic. Sulphuretted hydrogen gas instantly produces a precipitate of bisulphuret of arsenic [ $\text{As}^{\circ} \text{S}^3$ ]. Sulphuretted hydrogen-water, on the contrary, commonly causes the liquor to become coloured, and to precipitate only on the addition of a few drops of muriatic acid. Acetate of lead forms a copious egg-yellow precipitate of iodide of lead, and the nitrate of silver a copious yellowish white precipitate of iodide of silver. Starch, whether powdered or boiled, does not assume a blue colour from the contents of the liquid, even when sulphuric acid is added; this, however, occurs on the addition of concentrated nitric acid. The absence of colour in the solution indicates the absence of free iodine; and as the liquid does not assume any colour when in contact with the atmosphere, it may be inferred that it contains iodide of arsenic in an unaltered condition. Absorption of oxygen from the atmosphere does *not* take place for this reason:—if the liquor, after being exposed to the air, is mixed with nitrate of silver in excess, and the precipitate of iodide of silver removed by filtration, the strongly acid liquor yields, on the addition of ammonia only, a pure egg-yellow precipitate of arsenious oxide of silver. —*Arch. d. Pharm.* Oct. 1842.

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ART. XII.—*Apparatus for Exhausting the Soluble Constituents of Vegetables, &c.* By ANTHON.

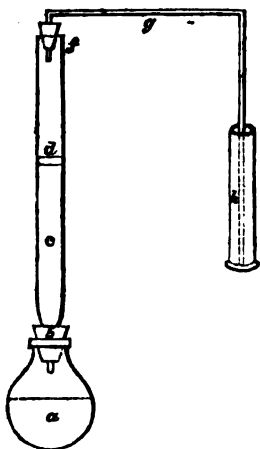
IN extracting the soluble portions of a vegetable substance, it is in most cases difficult to completely exhaust the ingredients acted upon; and this operation frequently requires a proportionately

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\* Berzelius' *Lehrb.* t. iii. p. 69.



large quantity of the extracting medium, especially in cases where the latter is of a very volatile nature. In order to avoid these inconveniences, the writer has employed, with success, the following apparatus, which is particularly well adapted for displacement on the small scale:—



*a* is a small flask, which is filled to half or to two-thirds with the liquor to be employed for extraction. This balloon is well closed by a cork *b*, through the centre of which passes the end of the cylinder *c*, contracted to a narrow tube, and the mouth of which ought not to be larger than so as to allow the liquid to pass in drops, rapidly succeeding each other, at the ordinary pressure of the atmosphere.

The cylinder *c*, for which any piece of glass tube, if only half an inch in diameter (or more) may be employed, is intended to admit the substance to be exhausted in a properly divided state.

This substance is then placed in the cylinder, slightly compressed, and, if necessary, covered with a small plate of tin perforated like a strainer. Instead of this, the space above the substance to be exhausted may sometimes be advantageously filled with small, clean-washed, broken pebbles or glass. The cylinder is closed at its upper end by the stopper *f*, through which passes the two-limbed tube *g*, reaching to the bottom of the condensing cylinder *h*, which is also of glass, standing in a larger vessel, not represented in the drawing, and which contains the water, ice, or snow, required for cooling.

Respecting the size of each several part of the apparatus, they vary, of course, according to the quantity of matter to be exhausted. For instance, in order to exhaust 200 grains of a somewhat light vegetable substance, the most convenient size of the balloon *a* would be such as would hold two ounces of water, with the cylinder *c* of the length of about six inches, and having an interior diameter of from half to three-fourths of an inch. The other proportions are a consequent of the preceding.

When this apparatus is used, all its parts are to be rendered air-tight, and arranged in the manner represented by the drawing, and the extracting medium contained in the balloon is heated over the spirit lamp to boiling. The steam, together with the atmospheric air contained in the balloon, then passes through the substance to be extracted, which condenses the steam and softens the vegetable matter, until it has assumed the temperature of the latter. Since, however, the contents of the cylinder *c* gradually

arrive at the temperature of the steam, this latter passes through the two-limbed tube *g*, and then is completely condensed in *h* when sufficiently cool. The greater part of the liquor being expelled from the balloon *a* in this manner into the condensing vessel *h*, the spirit lamp is to be removed. The steam contained in the balloon *a* then condenses; and a vacuum being thus formed, the whole of the liquid propelled to *h* is drawn back into the cylinder *c*, passing through the substance already softened, taking up its soluble parts, and will be found more or less charged with them. This part of the process having been completed, the spirit lamp is again placed in its former place: the vapour passes, as in the first instance, into *h*, leaving, however, the extractive matter already taken up, after which it is allowed to return through the substance to be extracted; and this operation is repeated as many times as may be requisite for obtaining all the soluble parts contained in the balloon *a*.

If a substance is to be extracted by ether or alcohol, it is sufficient to pour only a few drops into the balloon *a*, whilst the chief quantity is put in the condensing vessel *h*; the small quantity in *a* is then converted into steam by moderate heating, which expels the atmospheric air; the spirit lamp is then instantly removed, and the filtration takes place without its being necessary that the whole of the liquid should be previously distilled over. By cooling the balloon *a* with water, the filtration may be much accelerated.

It is as well not to allow the *extracting* liquid, after being distilled over to *h*, to return completely, but to leave always about the fourth part behind. The object of this caution is, that the steam of the exhausting liquor thus meeting in *h* with a more or less high column of liquid, may condense the more readily; and thus the least possible loss of exhausting liquid may be prevented, especially if care be taken that no more steam is evolved in *a* than may be perfectly condensed in the liquid at *h*, without being obliged to ascend to the surface in the form of steam bubbles.

As it is, with many substances, difficult to exhaust them, either by applying this apparatus, or any other method of exhaustion, a direct experiment will prove whether the exhaustion has been actually effected. In the case of the apparatus here described, this is performed, after the presumed complete exhaustion, by removing the balloon when all the liquor has re-entered it, emptying it out, and instituting a second experiment of exhaustion, in order to ascertain whether, by the evaporation of this second liquid obtained, any extractive matter be contained therein.

The substance to be operated upon, although it must be in a proper state of division, ought to be free from dust; or, if this

cannot be prevented, some clean cotton is to be placed at the end of the cylinder *c*, to prevent dusty portions from being carried into *a*, and thus contaminating the extract.—*B. R.*

[The advantage of a vacuum, which affords a pressure of fourteen pounds to the square inch, is obtained by the above arrangement; but a slight modification would enable the operator to obtain the force of high pressure steam conjointly with a vacuum, and thus the boiling liquid might be made to pass and repass the ingredients to be exhausted. In such an arrangement the displacement must, however, be arranged *per ascensum*. To effect this, the tube of the cylinder *c* must be drawn out so as to reach the bottom of the flask or balloon *a*. On applying heat, the cork or stopper *b* must be loosened to admit of the expulsion of atmospheric air\*; and when this has been effected, the cylinder *c* must be rendered air-tight at the point *b*. By continuing the application of heat, steam will form above the boiling liquid, and, by its continued formation, pressing on the surface of the liquid, will cause it to rise in the cylinder *c*. On removing the spirit lamp, and cooling the balloon, a vacuum occurs therein by the condensation of the steam, and the liquid descends; affording a visible exemplification of the principle for which a patent has been obtained for a coffee urn, and a very elegant lecture experiment.—*Ed.*]

#### ART. XIII.—*Pharmaceutico-Botanical Observations on Digitalis Purpurea.*

[For the Annals of Chymistry and Practical Pharmacy.]

AMONGST our indigenous medicinal plants, perhaps there is no one that demands more attention from the pharmacist than *Digitalis Purpurea*, on account of its acknowledged active properties, the nature and degree of which are points on which all medical practitioners do not coincide. Its history is very curious. To enter fully into this subject would perhaps occupy too much space. It was favoured with a place in our Pharmacopœias until the year 1746, when the great reformed Pharmacopœia was issued. It was readmitted in the year 1780, but no preparation of it was ordered by the College until the year 1809, when the tincture and the infusion appeared; and it is worthy of remark that the tincture of 1809 was in the proportion of one ounce of the dried leaf to eight ounces of proof spirit; and the tincture of 1836 is one ounce of the dried leaf to ten ounces of proof spirit. The infusion of 1809 was one drachm of dried leaf to eight ounces of water; and the infusion of 1836 is one drachm to

\* A small pin-hole drilled in the tube immediately below the stopper *b* will allow the escape of the air, without interfering with the principle so as to prevent its action; because steam forms far too rapidly to escape by so small a channel: not so air.

twenty ounces of water, and half an ounce of spirit of cinnamon. It is somewhat remarkable, that whilst it was not to be found in the College list of *Materia Medica*, it was more extensively employed in England than in any other country.—(J. A. Murray.) Although the plant grows abundantly in many parts of this island, and is cultivated for the beauty of its inflorescence in most of our gardens, yet I am well aware that many who are engaged in its manipulation find it rather a puzzling subject. Their difficulty exists in procuring preparations of uniform strength from it; in fact, this is no easy task; whilst some authors state that it should be gathered when in flower, or coming into flower, which, so far as it goes, is a very good rule. Another writes that the fresh green leaves, as the plant is a biennial, may be procured at all seasons of the year. One employed a decoction of the fresh green leaves; but this mode of exhibition is, I believe, now obsolete. It is not because it is a biennial that its fresh leaves can be procured at all seasons of the year, but because it happens to be a remarkably hardy plant. Most biennials have no leaves in the winter, familiar examples of which are the turnip and carrot. In the *digitalis* we find fresh green leaves throughout the winter, unless it be very severe. Dr. Pereira, in his excellent *Materia Medica*, has introduced some curious facts respecting the power of the tincture. It appears that Mr. King, of Saxmundham, in Suffolk, has given to a child, nine months old, two drachms, and to an adult he was in the habit of giving an ounce, and seldom less than half an ounce. This being rather a therapeutic than a pharmaceutical fact, I should not have introduced it but from its relation to pharmacy. Questions naturally arise respecting the quality of the article he employed. Some information on this point would have been very acceptable, more especially as we learn from Sir J. E. Smith, a distinguished botanist, who resided in the adjoining county of Norfolk, that *digitalis purpurea* does not grow in either Suffolk or Norfolk. Saxmundham, on the map, appears to be nearly thirty miles from any county in which the plant grows spontaneously. If the plant was cultivated there, an exact medico-botanist might reasonably suspect that the locality was not favourable to the plant, and might modify its properties.

I believe that our books will not safely guide the pharmacien; and the subject itself has its difficulties. It is easy to identify the plant when seen in full flower, but leaves are carried about for sale as *digitalis* which are no such thing; and it is not very easy to detect the mistake or fraud. I have known those who are not ignorant of the science of botany, to presume a leaf of *verbascum nigrum* to be *digitalis*. I once had these leaves offered to me by a herb-gatherer as *digitalis*; but being an old field botanist, it would not do; and in refusing to purchase the article, the man said, "I see you don't know foxglove; I have plenty of customers who will be glad of such leaves!"

To be kept from mistakes, the pharmacien should be able to identify the plant, and should know that it is a biennial, bearing in the first year very good-looking leaves, which very much resemble those of the second year; but which, according to the excellent rules of the Royal College of Physicians, should not be employed in medicine—*Folia decerpenda sunt postquam flores expansi fuerint*. Therefore, as biennial plants flower in their second year, it is then that their leaves are to be gathered. The first year's leaves are not admitted as medicinal. To distinguish these leaves is not so easy as some persons may imagine, if they are considered merely in reference to their shapes. Figures are published for the purpose of facilitating the discrimination, but I fear they will prove to be unsafe guides. The observer will see different shaped leaves on the same stalk, some ovate, and some approaching the lanceolate shape, and both equally good.\* We may follow the rule of the College, and still fail to produce a medicine of the proper strength, for the plant is much influenced by its locality. Those plants which grow in an open situation, and on a dry soil, produce the best leaves, but these are not always the most handsome. The best leaves are dark coloured, often of a purplish tinge, and of a firm texture, and not very large. Those which grow in a shady situation, as in woods and shady places, and in a rich soil, are fine showy plants, with tall stems, large flowers and leaves, but the latter are more or less flaccid, and of a bright green colour, and some of them very thin and delicate in texture: these are of an inferior quality to those produced in exposed situations. Some leaves are inferior to others on the same stem. We seldom get a bundle of digitalis without finding that at least one-third of the leaves should be rejected. The firm, sound, dark-green leaves only should be preserved. It is not sufficient that we obtain the proper leaves; the after management is not less important. Immediately on receiving the plant it should be loosely strewed about, and the flowering spikes cut off, for the vital energy of the fructification is supported by the plant for some days after it is removed from its soil, and the reproductive effort is so strong after it has reached a certain stage that it is difficult to extinguish it without entire separation of the organs. This is a curious fact to observe. As soon as possible the leaves should be removed from the stem, and their midrib cut out; and they should be dried as quickly as possible. As the leaf is not a delicate one, the peculiar mode of drying is of minor importance: in the open sunshine is perhaps the best place.

I confess it is a difficult thing to procure preparations from digitalis of

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\* There are a few points that it may be well to observe. The first year's leaves are generally brought into market attached to the crown of the root, or, if separated, the place of separation is abrupt. If the proper leaves are brought separate from the stem, which seldom is the case, a portion of the bark of the stem is generally found hanging from the extremity of the foot-stalk.

a uniform strength ; but I hope the foregoing observations will be of some assistance to those who wish to do the best they can ; and to those who reside in a part of the country in which digitalis is plentiful, I hope they will be of essential service, and that physicians will be careful not to publish their experience on the action of this important remedy without first ascertaining that it has been fairly employed, for I have reason to suspect that much of the discrepancy of opinion respecting the medicinal powers of digitalis has arisen from want of uniformity in pharmaceutical operations. A tincture of the flower of this plant has been employed ; and I have been informed by a practitioner in the west of England, who has extensively used it, that no preparation is so much to be depended upon as the tincture of the leaves. I believe this part of the plant will be found to be more uniform in its action than the leaf, and it well deserves the attention of medical practitioners, who are desirous of ascertaining what are truly the medicinal powers of digitalis purpurea.

I am, gentlemen, your obedient servant,

London, Nov. 15, 1842.

HERBARIUS.

#### ART. XIV.—*Per- or Sesqui-iodide of Iron.*

*To the Editors of the Annals of Chymistry and Pharmacy.*

GENTLEMEN,—In consequence of your reprinting part of Mr. Squire's letter, I have been induced to draw up a few observations on the Per- or Sesqui-Iodide of Iron : should they meet with your approval, I may probably furnish some additional remarks.

Mr. R. Phillips describes two iodides of iron (Penny Cyclopædia, art. Iron, 1838). The periodide may be formed by digesting "iron with an excess of iodine, and subliming the product : it is a red volatile compound, deliquescent, and soluble in water and in alcohol.

"It is composed of  $1\frac{1}{2}$  eq. Iodine . . . 189  
1 eq. Iron . . . 28

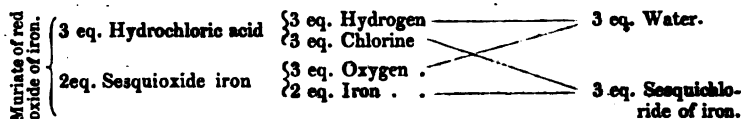
Eq. . . 217."

More recently Drs. Pereira and Christison have admitted the existence of this salt. But Dr. Kane says, in speaking of the iodide—"a solution of the protiodide of iron dissolves iodine abundantly, becoming brown, and possibly containing the sesquiodide  $\text{Fe}_2\text{I}_3$  ; but it is more likely that the iodine is not combined, as it is sensible to the test of starch."

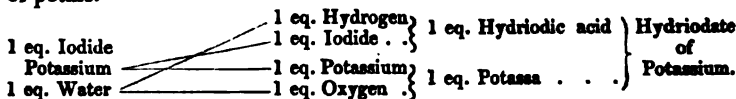
To determine the question as to the state of combination, Mr. S. precipitates the oxide from a solution of iodide of iron. This will be generally admitted as a test. If the iron be in a state of iodide, it will be thrown down as protoxide ; if a sesquiodide, as per- or sesquioxide.

Mr. S. further tells us, he could not form a periodide by a persalt of iron and iodide of potassium.

I think I may say I have arrived at satisfactory results, by the method of double decomposition. The salt of iron used was the sesquichloride, composed (it is generally admitted) of—1 eq. Iron, 28;  $1\frac{1}{2}$  eq. Chlorine, 54. Or, if the old theory be preferred,



The iodide of potassium may be regarded as consisting of 1 eq. Iodine, 126; 1 eq. Potassium, 40 = 166. Or, in solution, as hydriodate of potass.



On mixing aqueous solutions of these salts the solutions were reddened, showing some change had taken place; but no precipitate occurred, owing to the resulting salts being soluble in water. With a view to separate them, the mixed solutions were added to an equal quantity of rectified spirit, and, after standing, a precipitate did result.

The change took place almost immediately on mixing the tinct. ferri sesquichlor. with a solution of iodide of potassium in rectified spirit. The precipitate was slightly coloured, but, on washing it with a little spirit, was obtained nearly white.

The supernatant liquid was of a very dark-reddish colour. When mixed with water it reddened litmus and coloured starch. Treated with solution of nitrate of silver it threw down a yellowish-white precipitate. Ammonia digested on it dissolved a white powder\* in small quantity, which was thrown down on supersaturating with nitric acid.

Caustic potash threw down a deep orange precipitate.

Prussiate       "       "       a deep blue.

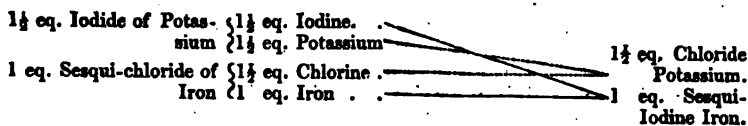
Infusion of galls struck a deep black.

It was scarcely necessary to test the white precipitate, as we might be prepared for the result. It was perfectly soluble in water. Neutral. A solution of tartaric acid gave a white precipitate (bitartrate), and nitrate of silver a white precipitate (chloride of silver), wholly soluble in ammonia, which was again precipitated by nitric acid. I cannot undertake

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\* This I attribute to chloride of potassium being slightly soluble in S. VR.

the quantitative analysis, but I think, from what is stated above, we may infer the following changes take place:—



The fact of iodine being sensible to the starch test in sesquiodide of iron would seem to prove that it exists in an aqueous solution as a sesquiodide, and not as hydriodate of the sesqui-oxide, as Dr. Christison asserts.

Wishing your valuable journal every success,

I remain, yours respectfully,

St. Nicholas' Church Yard, Newcastle,  
November 14, 1842.

WILLIAM PROCTOR.

#### ART. XV.—*A new Method of Preparing Cinnamic Acid.*

*To the Editors of the Annals of Chymistry and Pharmacy.*

GENTLEMEN,—Having recently had occasion to prepare, amongst other chymical products, a quantity of cinnamic acid, and finding that Turner's process for making it from the oil of balsam of Peru was a tedious and expensive operation, and that the product was exceedingly small in proportion to the quantity of balsam employed, I was led to make some experiments with a view of preparing this acid more economically. This I soon found might be effected by distilling genuine balsam of Tolu, the price of which is now very low. On subjecting this article to a gentle heat in a retort, it fuses, and a little water and fragrant volatile oil first come over. These are succeeded by the cinnamic acid, which distils over in the form of a heavy oil, condensing in the cool part of the neck of the retort into a white crystalline mass. This gradually becomes contaminated with an empyreumatic oil that arises towards the end of the operation. The acid may be freed from this oil by pressure between folds of filtering paper, and afterwards dissolving in a large quantity of boiling water, from which it deposits on cooling in minute colourless crystals. This process is very productive: so much so, that the balsam of Tolu I employed yielded an eighth of its weight of pure acid—minus a few grains.

I have taken the liberty of addressing these few remarks to you on the subject, as the process above described is much more simple than that mentioned in modern chymical works, and is, I believe, at present unknown.—I am, gentlemen, your obedient servant,

GEORGE HEAYER.

Wolverhampton, November 18, 1842.



ART. XVI.—*Analysis of Manure.* By M. PAYEN.

TAKE a strong glass tube, and close it, by heat, at one end. The next step is to dry it; and this may be done by rinsing the tube with a small quantity of warm deutoxide of copper. When any moisture which may be contained in the tube is thus removed, you introduce a small quantity of the bicarbonate of soda: in addition to this, you add a layer of deutoxide of copper, and then about six grains of the manure well dried and mixed with a little deutoxide of copper. Above this mixture you place some copper shavings perfectly free from oxide; then a fresh layer of oxide of copper; and lastly, you fill the tube with metallic copper. This done, the tube is surrounded with copper-leaf, supported by twisting iron wire round it, taking care to leave the part of the tube which contains the bicarbonate of soda free. The combustion tube is then placed in a long furnace, and made to communicate at one end with a double-branched tube, one branch of which communicates with a vessel containing mercury, and the other with one of Gay-Lussac's small air-pumps. When this tube has been fixed on the combustion tube, the air-pump is worked, for the purpose of trying if all the joints are true. When this is ascertained, a receiver, two-thirds full of mercury, is placed erect in the mercury bath and above the extremity of the receiving tube, its upper third being filled with a concentrated solution of potass. The furnace is now filled with charcoal, commencing opposite the part of the tube which contains the deutoxide of copper (the tube containing the soda is to be heated subsequently); and, under the influence of heat, the organic substance undergoes decomposition: its oxygen and carbon form carbonic acid; the hydrogen unites with oxygen to form water, and passes with the nitrogen, under the form of vapour, into the receiver containing mercury; the carbonic acid is taken up by the potass; the watery vapour is condensed, while the insoluble nitrogen passes to the upper part of the receiver, and displaces the fluid. When the operation is terminated, which is known by the gas ceasing to be disengaged, the extremity of the tube containing the bicarbonate of soda is then heated. The bicarbonate is thus decomposed, and emits a considerable quantity of carbonic acid gas, which sweeps along the combustion tube, and carries with it any gases which might have remained there. The above operation having been completed, the solution of potass is carefully shaken in the mercury bath, so as to saturate any carbonic acid which may have been mixed with the nitrogen. If we have any reason to fear that the saturation is not complete, a small piece of caustic potassa may be introduced into the solution. The receiver is now removed from the mercury bath, placed in an earthen vessel full of water, and the mercury is re-

moved and replaced by water: all this must be done with very great care. Finally, the gas which now occupies the upper part of the receiver, and is pure nitrogen, is transferred to a small graduated bell to ascertain its volume, &c. When we have obtained the volume we easily get the weight, according to the following formulæ:—

|                           | Temp. | Pressure. | Weight.    |
|---------------------------|-------|-----------|------------|
| 1 quart of dried nitrogen | 0°    | 0.76      | 1.259 grs. |
| 1 (moist)                 | 15°   | 0.77      | 1.188 „    |
| 1 . . . . .               | 15°   | 0.76      | 1.172 „    |
| 1 . . . . .               | 15°   | 0.75      | 1.156 „    |
| 1 . . . . .               | 15°   | 0.74      | 1.140 „    |

*From the Provincial Medical Journal.*

#### ART. XVII.—*Salicine.*

THIS active principle has been obtained by Riegel, according to Herberger's method, also from the bark of the young tree and leaves of *Salix fragilis* L., and likewise from the young bark of *Salix caprea* L. (Ten ounces of bark yielded 165 grains of this principle.)—*Jahrb. f. pr. Pharm.*

*Report of an Examination and Analysis of the Patent Aqua Chalybeata of Messrs. Bewley and Evans, Pharmaceutical Chymists, &c. Dublin.* By ANDREW URE, M.D. F.R.S. Prof. of Chymistry, and Analytical Chymist.

THIS water consists of a solution of citrate of iron highly charged with carbonic acid gas, and is rendered peculiarly palatable by means of a little aromatized syrup. Six fluid ounces of it are contained in each bottle; and these afford, on analysis, seven grains and nine-tenths of peroxide of iron, corresponding to thirteen grains and a half of citrate of iron present in the bottle when prepared. This organic salt is, therefore, in accordance, as to composition, with the latest researches of Liebig, as also with mine published in the *Phil. Trans.* for 1822. The atomic weight of citric acid, as it exists in the citrate of silver, is, according to the German Chymist, 165 ( $C_{12}H_{10}O_{11}$ ), taking the British atomic weights for carbon and oxygen: and since this acid is tribasic (in his view) it will combine with three atoms of peroxide of iron =  $3 \times 79 = 237$ . Now  $237 : 165 :: 7.9 : 5.5$ , as given above. By my experiments on citric acid (*Phil. Trans.*), its atomic weight with one atom of water, as in the citrate of silver, is 57 to hydrogen 1, which combines with one atom of peroxide of iron = 79, to form 136 of the ferric citrate, being proportions differing little from the preceding.

This Chalybeate-water cannot change by carriage, or keeping, as the oxide of iron is held combined by so strong an affinity as to resist separation by the most powerful decomposing agents, such as the succinate and benzoate of ammonia, even with ammonia in excess—means which precipitate oxide of iron from all its inorganic saline compounds.

The Aqua Chalybeata contains no ammonia; for, when heated with caustic potassa, it affords no trace of the volatile alkali, either by smell or by chymical reagents. Two ounces of this water are an average dose, and contain two grains and two-thirds of ferric oxide.

From the richness of this preparation, and its chymical permanence, it promises to form the most efficacious of chalybeate medicines.

13, Charlotte Street, Bedford Square, Nov. 18, 1842.

| NOMINA.                                      | FORMULÆ.                                                   |
|----------------------------------------------|------------------------------------------------------------|
| <i>Arsenietum</i> Niccoli . . . . .          | Ni As . . . . .                                            |
| <i>bi Arsenietum</i> Niccoli . . . . .       | Ni As <sub>2</sub> . . . . .                               |
|                                              | $\frac{1}{2}$ . . . . .                                    |
| <i>Arseniis</i> Aluminicus. . . . .          | $\ddot{\text{Al}}_2 \ddot{\text{As}}_2$ . . . . .          |
|                                              | $\frac{1}{3}$ . . . . .                                    |
| — Ammonicus . . . . .                        | 2N <sub>2</sub> H <sub>2</sub> + As <sub>2</sub> . . . . . |
| — Argenticus . . . . .                       | Ag <sup>+</sup> As <sub>2</sub> . . . . .                  |
| — Baryticus . . . . .                        | Ba <sup>+</sup> As <sub>2</sub> . . . . .                  |
| — Calcicus . . . . .                         | Ca <sup>+</sup> As <sub>2</sub> . . . . .                  |
| — Cobalticus . . . . .                       | Co <sup>+</sup> As <sub>2</sub> . . . . .                  |
| — Cupricus . . . . .                         | Cu <sup>+</sup> As <sub>2</sub> . . . . .                  |
| — Cuprosus . . . . .                         | Cu <sup>2</sup> As <sub>2</sub> . . . . .                  |
| — Ferricus . . . . .                         | Fe <sup>2</sup> As <sub>2</sub> . . . . .                  |
|                                              | $\frac{1}{2}$ . . . . .                                    |
| — Ferrosus . . . . .                         | Fe <sup>+</sup> As <sub>2</sub> . . . . .                  |
| — Kalicus . . . . .                          | K <sup>+</sup> As <sub>2</sub> . . . . .                   |
| — Natricus . . . . .                         | Na <sup>+</sup> As <sub>2</sub> . . . . .                  |
| — Niccolicus . . . . .                       | Ni <sup>2</sup> As <sub>2</sub> . . . . .                  |
| — Plumbicus . . . . .                        | Pb <sup>2</sup> As <sub>2</sub> . . . . .                  |
| <i>bi Arseniis</i> Plumbicus . . . . .       | Pb As <sub>2</sub> . . . . .                               |
| <i>Arseniis</i> Stronticus . . . . .         | Sr <sup>+</sup> As <sub>2</sub> . . . . .                  |
| <i>Arsenio</i> sulphuretum Cobalti . . . . . | Co As <sub>2</sub> + Co . . . . .                          |
| — Ferri . . . . .                            | Fe As <sub>2</sub> + Fe . . . . .                          |
| — Niccoli . . . . .                          | Ni As <sub>2</sub> + Ni : . . . . .                        |
| <i>Aurum</i> . . . . .                       | Au . . . . .                                               |

| PONDERA ATOMORUM. |                    | PARTES CENTESIMALES. |                 |                      |
|-------------------|--------------------|----------------------|-----------------|----------------------|
| O = 100           | H <sub>+</sub> = 1 | + E                  | —E              | H vel H <sub>+</sub> |
| 839,72            | 67,29              | 44,02                | 55,98           |                      |
| 1309,76           | 104,95             | 28,22                | 77,78           |                      |
| 654,88            | 52,48              |                      |                 |                      |
| 5004,92           | 401,05             | 25,67                | 74,33           |                      |
| 1668,81           | 133,68             |                      |                 |                      |
| 1893,99           | 151,77             | 34,53                | 65,47           |                      |
| 4143,30           | 332,01             | 70,07                | 29,93           |                      |
| 3153,84           | 252,72             | 60,68                | 39,32           |                      |
| 1952,12           | 156,43             | 36,48                | 63,52           |                      |
| 2178,07           | 174,53             | 43,07                | 56,93           |                      |
| 2231,47           | 178,81             | 44,43                | 55,57           |                      |
| 3022,86           | 242,22             | 58,98                | 41,02           |                      |
| 5677,07           | 454,91             | 34,47                | 65,53           |                      |
| 1892,36           | 151,63             |                      |                 |                      |
| 2118,49           | 169,76             | 41,46                | 58,54           |                      |
| 2419,92           | 193,91             | 48,76                | 51,24           |                      |
| 2021,88           | 162,02             | 38,67                | 61,33           |                      |
| 2179,43           | 174,64             | 43,10                | 56,90           |                      |
| 4029,08           | 322,85             | 69,22                | 30,78           |                      |
| 2634,58           | 211,11             | 52,93                | 47,07           |                      |
| 2534,65           | 203,10             | 51,07                | 48,93           |                      |
|                   |                    | Co                   | As <sub>+</sub> | S                    |
| 2080,40           | 166,70             | 35,47                | 45,19           | 19,34                |
|                   |                    | Fe                   | As <sub>+</sub> | S                    |
| 2020,82           | 161,93             | 33,57                | 46,52           | 19,91                |
|                   |                    | Ni                   | As <sub>+</sub> | S                    |
| 2081,76           | 166,81             | 35,52                | 45,16           | 19,32                |
| 1243,01           | 99,60              |                      |                 |                      |

| NOMINA.                             | FORMULÆ.                                   |
|-------------------------------------|--------------------------------------------|
| <i>Aurum</i> . . . . .              | Au <sub>2</sub> . . . . .                  |
| <i>Baryta</i> . . . . .             | Ba . . . . .                               |
| <i>Barium</i> . . . . .             | Ba . . . . .                               |
| <i>Benzoas</i> Aluminicus . . . . . | Al <sub>2</sub> Bz <sup>3</sup> . . . . .  |
| —                                   | $\frac{1}{2}$ . . . . .                    |
| — Ammonicus . . . . .               | N <sub>2</sub> H <sub>2</sub> Bz . . . . . |
| — Argenticus . . . . .              | Ag Bz . . . . .                            |
| — Baryticus . . . . .               | Ba Bz . . . . .                            |
| — Bismuthicus . . . . .             | Bi Bz . . . . .                            |
| — Cadmicus . . . . .                | Cd Bz . . . . .                            |
| — Calcicus . . . . .                | Ca Bz . . . . .                            |
| — Cericus . . . . .                 | Ce <sub>2</sub> Bz <sup>3</sup> . . . . .  |
| —                                   | $\frac{1}{2}$ . . . . .                    |
| — Cerosus . . . . .                 | Ce Bz . . . . .                            |
| — Chromicus . . . . .               | Cr <sub>2</sub> Bz <sup>3</sup> . . . . .  |
| —                                   | $\frac{1}{2}$ . . . . .                    |
| — Cobalticus . . . . .              | Co Bz . . . . .                            |
| — Cupricus . . . . .                | Cu Bz . . . . .                            |
| — Cuprosus . . . . .                | Cu <sub>2</sub> Bz . . . . .               |
| — Ferricus . . . . .                | Fe <sub>2</sub> Bz <sup>3</sup> . . . . .  |
| —                                   | $\frac{1}{2}$ . . . . .                    |
| — Ferrosus . . . . .                | Fe Bz . . . . .                            |
| — Glucinicus . . . . .              | G <sub>2</sub> Bz <sup>3</sup> . . . . .   |
| —                                   | $\frac{1}{2}$ . . . . .                    |
| — Hydrargyricus . . . . .           | Hg Bz . . . . .                            |
| — Hydrargirosus . . . . .           | Hg <sub>2</sub> Bz . . . . .               |
| — Hydricus . . . . .                | H <sub>2</sub> Bz . . . . .                |

| PONDERA ATOMORUM. |                    | PARTES CENTESIMALES. |       |                      |
|-------------------|--------------------|----------------------|-------|----------------------|
| O = 100           | H <sub>2</sub> = 1 | + E                  | — E   | H vel H <sub>2</sub> |
| 2486,03           | 199,21             |                      |       |                      |
| 956,88            | 76,68              | 89,55                | 10,45 |                      |
| 856,88            | 68,66              |                      |       |                      |
| 4939,90           | 395,84             | 13,00                | 87,00 |                      |
| 1646,63           | 131,95             |                      |       |                      |
| 1759,48           | 140,99             | 18,58                | 81,42 |                      |
| 2884,13           | 231,33             | 50,33                | 49,67 |                      |
| 2389,40           | 191,47             | 40,05                | 59,95 |                      |
| 2419,44           | 193,87             | 40,79                | 59,21 |                      |
| 2229,29           | 178,64             | 35,74                | 64,26 |                      |
| 1788,54           | 143,32             | 19,91                | 80,09 |                      |
| 5746,96           | 460,51             | 25,22                | 74,78 |                      |
| 1915,65           | 153,50             |                      |       |                      |
| 2107,22           | 168,85             | 32,02                | 67,98 |                      |
| 5301,20           | 424,79             | 18,93                | 81,07 |                      |
| 1767,07           | 141,60             |                      |       |                      |
| 1901,51           | 152,37             | 24,66                | 75,34 |                      |
| 1928,22           | 154,51             | 25,71                | 74,29 |                      |
| 2323,91           | 186,26             | 38,36                | 61,64 |                      |
| 5275,08           | 422,77             | 18,54                | 81,46 |                      |
| 1758,66           | 140,92             |                      |       |                      |
| 1871,73           | 149,98             | 23,47                | 76,53 |                      |
| 5260,09           | 421,50             | 18,30                | 81,70 |                      |
| 1753,36           | 140,50             |                      |       |                      |
| 2798,35           | 224,23             | 48,81                | 51,19 |                      |
| 4064,17           | 325,67             | 64,75                | 35,25 |                      |
| 1545,00           | 123,80             |                      | 92,72 | 7,28                 |

ART. XX.—*On a certain Concretion found in a Castor Bag.*

ONE of the most interesting objects which I had occasion to examine during fifteen years of pharmaceutical pursuits, was a certain secretion in a bag of castor. In the interior of a bag of Canadian castor, genuine and good by all external characteristics, I met with a peculiar mass, in a separate compartment, formed by two membranes. This mass had an ochreous yellow appearance, was rough and earthy to the touch; which remark applies also to the broken surface. In the mass itself there were many very glittering points, consisting of rhombohedral crystals, perceptible only with a microscope. The mass was entirely insoluble in water, and dissolved to a very slight extent only in spirit of wine and ether, both of which assumed an odour of castor. Nitric acid imparted a red colour to the mass, which changed the action, by boiling nitric acid, into purple red. I ascertained that the component parts of this concretion, besides colouring matter, were chiefly urate, phosphate, and carbonate of lime, with magnesia.—*Landerer, in Buchner's Repert.*

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\*.\* Communications, Books for Review, &c. are requested to be addressed —“To the Editors of the ANNALS OF CHYMISTRY, care of Messrs. Longman, Brown, and Co. Paternoster Row.”

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**ELEMENTARY COURSE OF PHARMACY;**

CHIEFLY FROM THE GERMAN OF

P. A. CAP AND RUDOLPH BRANDES,

COLLATED WITH THE WORKS OF

PHŒBUS, SOUBEIRAN, GUIBOURT, LECANU, DUFLOS, GMELIN, &c.

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INTRODUCTION.

Man gebe seinen Zöglingen ueberall  
mit gutem Beispiel vor, und unterrichte  
sie selbst in allen Zweigen.—*Bley*,  
*Archiv. der Pharmacie*, 2 R. Bd. xxi.

"Always furnish a good example to your  
pupils, and instruct them yourself in every  
branch of the business."

1. Notwithstanding the art of preparing medicine has been studied in its most minute details, yet there has not hitherto appeared any comprehensive systematic arrangement, either in the schools or other establishments where it has been taught and practised. Brief essays, it is true, have been published on this subject; whilst some excellent compendiums, embracing the whole domain of pharmacy, have been given to the world, with others which treated only of its several branches. The public are, of course, unaware of the extreme difficulty of this art; and even the philosopher, intent on his own speculations, has but an imperfect perception of it. Nay, the chymist and druggist himself, pursuing a profession the true limits of which it would be hard to define, constantly extending as they are with the enlargement of his own faculties, even he scarcely regards this art with the interest which it deserves. The youth, who devotes himself to pharmacy, searches in vain for a trustworthy guide through the long series of studies which he is now left to wander over ere he becomes fully competent. Fortunate,



indeed, may he esteem himself, if, at the commencement of his pharmaceutical career, he meets with an experienced friend ready to aid him with his advice, and willing to direct his steps in the right path: seldom, however, is this the case.

The aim of the present essays is to define, in a precise manner, the true object of this branch of medical science, and the best means of becoming acquainted with it—to sketch such parts as connect it with the other branches of science, together with those which separate it therefrom—and lastly, to explain the fundamental principles of pharmacy, as well as the several sciences on which it is based; and thus furnish the pupil with a standard to which he may refer for all those branches of knowledge which, at present, he can only attain gradually, and after he has made some progress in the study of his profession.

§ 2. *Pharmacy*.—That pharmacy is a branch of the medical science few will be so hardy as to deny, since the art of healing can never dispense with the application of medicine. In the earliest ages, when medical science was in its infancy, and merely comprised a few empirical tenets, its several branches were not separated into the different departments of medicine, pharmacy, and surgery, but were practised by one and the same individual. Medicine, or the art of curing internal diseases—surgery, the art of curing external diseases—and pharmacy, the art of preparing remedies, were then considered as inseparable. It was only after a long space of time, when each of these several branches had attained a considerable extent, partly by experience, and the more precise theory to which this led, and by increased practice, that the impossibility of combining all these different branches, both theoretically and practically, became evident. Hence originated the division of medical science into its three principal branches of medicine, surgery, and pharmacy.

§ 3. *Medicine*.—There is scarcely any one science based on a more extensive and varied series of acquired information than medicine, or medical science in the widest acceptation of the term. The study of the physical condition of man; of that power which is the basis of the phenomena of life; of the mutual action which the organs exert on each other; of the causes which influence the regular course of the functions of these organs; of the history and classification of diseases; a knowledge of the means of controlling them as the irregular conditions of the body, and to reduce the system, if possible, to its normal state; the art of employing certain means for the purpose of acting on the economy of life—all these are so many objects of experiment, and so many oppor-

tunities for the exertion of the intellectual powers, as to exceed the faculties of one individual. It therefore became necessary that different branches should be formed for the practice of medical science; and that whatever concerns the preservation and restoration of health should be divided among these. A short historical *exposé* of the rise of pharmacy will clearly prove the necessity of these divisions of medical science into different branches, serving to place before the eyes of the pupil a picture of the gradual improvement of that profession to the practice of which he is about to devote himself.

§ 4. *History of Pharmacy*.—In remote times medical art was, of course, a mere mass of casual experience and observations on the course of diseases, of cures, and the means, either accidental or intended, employed for that purpose. These were gradually collected and arranged by eminent men, and proposed as the germs of the science according to their views. Thus, when this collection of varied experience and observation was increased, medical men were created. The Egyptians employed decoctions of vegetable substances as remedies for disease. The Israelites carried their knowledge into Palestine. A thousand years before Christ, the Asclepiades were occupied, in the Temple at Kos, preparing remedies from the juice of herbs and ointments. Until the time of Hippocrates, however, the art of properly preparing remedies can hardly be spoken of as having a definite existence. Hippocrates, Attulus Philometer, Mithridates Eupator, Nicander, of Colophon, chiefly contributed to the improvement of the art of preparing remedies among the Greeks. About 330 years before Christ, pharmacy was esteemed as a distinct branch of science.

§ 5. *Origin of Druggists*.—The most eminent physicians of former ages directed their remedies to be prepared by workmen, or their own assistants. They had separate places (*arpeia*) where they dispensed their preparations. The greater part of the remedies consisted at this time of vegetable substances; and the gathering of these substances was the peculiar business of these workmen or assistants, who were, therefore, called Rhizotomi (root-diggers), and afterwards also Pharmacopoli, because they were frequently employed in the sale of remedies. This applies to the time of Aristotle (about 350 years before Christ). Several of these pharmacopolists (Aristotle himself received this appellation from Epicureus, because he had been engaged during his youth in collecting and selling medicinal herbs), as Eudemus, a pupil of Aristotle, Thrasius, of Mantinea, and others, had acquired much valuable knowledge of natural history by a careful attention to their occupations; and when the number of remedies was increased by the products of India, Persia, and Egypt; when the Ptolemies at Alexandria founded a school intended for

medical education, and the medical art extended so much that physicians could no longer occupy themselves with the preparation of remedies; pharmacopolists then became druggists, and pharmacy an independent profession. Books on the preparation of remedies, and the arrangement of the laboratory, were written as early as 200 years before Christ. The first work on remedies is said to have been written by Heraclitus.

After the conquest of Greece by the Romans the medical art was more cultivated among them; and the works of Pedarcus, Dioscorides, Claudius, and Galenus, as also those of Plinius, and the Reports of Cato Menecrates and Scribonius Largus, give evidence as to the state of this science at that period, which, with the decline of the Roman empire, sank, as did other sciences. When the Arabs, in the seventh century, conquered Egypt and Greece, and afterwards Spain, they zealously devoted themselves to science. Their Caliphs founded libraries and schools. The medical art was chiefly cultivated by the Arabs, and even became the object of legislative enactments. At the Academy at Bagdad, so renowned in the eighth century, medical science was taught, and public hospitals were instituted. It was there that the first public dispensary was established. The preparation of remedies was submitted to the surveillance of the authorities; and in the ninth century the first Arabian Pharmacopœia was composed by Sabor Ebn Sahel, Lecturer at the High School at Dshondisabur.

It was an Arabian who laid the first foundation of pharmacy as it exists at the present time; and Abu Tbn Kareish may be considered as the first druggist.

## CHYMISTRY, OPERATIVE AND EXPERIMENTAL.

ART. II.—*On the Adulteration of the Oils of Commerce.* By  
M. HEIDENREICH.

[Continued from page 215.]

3. *The Density of Oils.*—Every oil supposed to come from the same plant, or the same animal, has its peculiar density, which, at the same temperature, never can deviate more than some few thousand parts.

This density is, in oils hitherto examined, between 0.900 [tallow-oil] and 0.96 [castor-oil] [Ricinus-oil]; water, at 15° C. = 59° F. taken as unity. This answers, on the centigrade alcoholometer of Gay-Lussac, to the densities of the 66th degree to the 34th. For greater perspicuity I have added the table arranged by Schübler, together with the degrees of Gay-Lussac's

alcoholometer. We deemed it best to add the latter, since it is very generally used, and saves employing other instruments. Care has only to be taken to procure a scale the degrees of which are at proper distances. Besides this, an oil-balance could easily be arranged, on the same principle, by placing, at the temperature of  $15^{\circ} = 59^{\circ} \text{ F.}$ , the number 0.970 as the extreme point at one end of the scale, or a little higher than the density of castor-oil, and for the extreme density of oleic acid .900, and dividing the intervals between these into 70 degrees, in such a manner that each degree answers to a thousandth part on the table of densities.

TABLE OF THE SPECIFIC GRAVITY OF SOME OILS.

[From Erdmann's Journal f. techn. u. ök Chemie, Bd. li. S. 380.]

| NAME.                                                       | Specific Gravity. | Degrees on Gay-Lussac's Alcoholometer. | Degrees on Fischer's oil-balance.  |
|-------------------------------------------------------------|-------------------|----------------------------------------|------------------------------------|
| Tallow oil . . . . .                                        | 0.9003            | 66                                     |                                    |
| Rape-seed oil (Navatte) }<br>(Brass. napus oleifera Dec.) } | 0.9128            | 60½                                    | { 37 to 38<br>Purified<br>38 to 39 |
| Rape-seed oil (Colza) }<br>(Brass. campestr. oleif.) }      | 0.9136            | 60½                                    |                                    |
| Summer rape-seed oil (Levante) }<br>(Brass. praecox Dec.) } | 0.9139            | 60                                     |                                    |
| Olive oil . . . . .                                         | 0.9176            | 58½                                    | 37 to 38                           |
| Beechnut oil . . . . .                                      | 0.9225            | 56                                     |                                    |
| Purified whale-train . . . . .                              | 0.9231            | 95½                                    |                                    |
| Poppy oil . . . . .                                         | 0.9243            | 55½                                    | 32 to 33                           |
| Dötter oil (cameline) }<br>Myagrum (astivum) }              | 0.9252            | 54½                                    | 31 to 32                           |
| Linseed oil . . . . .                                       | 0.9347            | 50                                     | 29 to 30                           |
| Castor oil . . . . .                                        | 0.9911            | 33½                                    |                                    |

By examining this table, we find, as regards the different commercial oils, especially those commonly used for adulteration, an obvious difference of density: thus, for instance, the different rape-seed oils weigh at  $15^{\circ}$  between  $60\frac{1}{2}$  and  $60^{\circ}$ , according to the alcoholometer, whilst beech-nut oil weighs  $56^{\circ}$ ; fish train,  $55\frac{1}{2}^{\circ}$ ; poppy oil,  $55\frac{1}{2}^{\circ}$ ; dötter oil (cameline),  $54\frac{1}{2}^{\circ}$ ; and linseed oil,  $50^{\circ}$ . In case, therefore, in which rape-seed oil indicated less than  $60^{\circ}$ , it might be inferred with certainty that it had been mixed with another oil. The same would be the case with olive oil, if indicating more or less than  $58\frac{1}{2}^{\circ}$ . It is true that the knowledge of the density of an oil does not precisely indicate by what oil, the adulteration may have been performed; but, in this case, we can recur to the odour which the oils evolve when exposed to heat, and to the comparative experiments, previously mentioned, with sulphuric acid. The oil which has been employed for adultera-

tion having been ascertained; the alcoholometer shows with certainty to what degree the adulteration extends.

This latter means of examination has indeed already been employed by some in the trade; and I am astonished that it is not more generally applied, since it is a sufficiently good guide alone, and, if combined with the two others, I doubt if any one could be deceived.

[To be continued.]

#### ART. III.—*Manufacture of Oil of Vitriol from Iron Pyrites.*

THE manufacture of sulphuric acid and soda is carried on conjointly, in a factory at Belgium, in the following manner:—The residua of the roasted pyrites are mixed with an excess of sea salt, having previously ascertained the contents of sulphate of iron contained therein. The mixture is then heated in an appropriate furnace, arranged so as to collect the muriatic acid. The sulphate of soda formed is obtained by solution and crystallization; the peroxide of iron remaining is separated by elutriation into two parts: the most finely divided is dried and mixed with grease or palm oil, serving as a lubricator for machinery, for which it is admirably adapted; whilst the coarser portions are made into balls, dried, and used as mineral iron for the puddling furnace. In factories where soda is not made concurrently with sulphuric acid, in place of procuring the sulphate of iron from the roasted pyrites it will be more advantageous to distil these residua, the sulphate of iron being first dried, so as to obtain the fuming sulphuric acid of Northausen, as it is termed. It would be very easy to arrange the apparatus in such a manner that the sulphurous acid, arising from the decomposition of part of the sulphate of iron, should be conducted into leaden receivers or chambers. By such an arrangement nothing would be lost, since the colcothar or peroxide of iron remaining after the process has been completed, is always available.

#### ART. IV.—*On the Analysis of Oxgall, and the Characteristic Properties of its Elements.* By the Baron J. BERZELIUS.

[From the Kongl. Vet. Acad. Handl.]

[Continued from page 212.]

2. *The liquid undissolved in ether*, and supersaturated with bilin, is diluted with a little water, and treated with the recently precipitated magma of oxide of lead, according to the process previously laid down, when a plasterlike combination is formed, together with bilin mixed in the fluid, is obtained, which in this part of the process is not so high coloured as that formerly described, although it always is difficult to produce it quite colourless from fresh and unbleached gall.

If sulphuric acid has been employed, in order to induce more powerful action with the ether, the fluid will be acid. Carbonate of lead is, then, employed first, in order to saturate the acid completely; the sulphate of lead is then removed by filtration, and the liquid is next treated with oxide of lead at a high temperature. The sulphuric acid combines less readily with the pure oxide of lead than with the more finely divided carbonate of lead, which latter it takes up very quickly.

The plastic combination is treated according to the directions previously laid down, when it yields similar products, and the operation may be continued in this manner, so that the whole mass is separated into acids supersaturated with, and others free from, bilin, until there remains so little residue that it is not worth while to continue the operation.

I have stated in the preceding narration that the plasterlike combination of oxide of lead is to be extracted at first with spirit of wine until exhausted, and then boiled with carbonate of soda. The soda extracts from the oxide of lead stearic and bilicholeic acids, which are precipitated therefrom by sulphuric acid, when sulphuric acid, containing bilin, remains in the liquid. I shall return hereafter to the removal of the bilin from such acid liquid.

The precipitated acid is in itself coherent; it is treated at first with a very little ether, by which stearic acid is extracted therefrom. This is repeated with a larger quantity, which dissolves choleic acid, although nearly insoluble therein: it is for this reason that it is much more difficult to separate the bilin by treating it with ether. At first a solution of bilin is obtained, from which bilin may again be separated by oxide of lead: this, however, soon ceases, and ether then leaves a semiliquid mass, insoluble in water, which yields no more bilin, and a small portion of which is dissolved by the ether. This is bilicholeic acid, containing a minimum of bilin, which I considered for a long time as a peculiar acid, possessing the property of easily dissolving in solution of barytes, and precipitable by acids from its combinations with bases, either in the form of a coherent mass, assuming, when dry, a semitransparent appearance; or, if the precipitation has been made in a dilute solution, it yields a milk-like fluid, from which the precipitate does not separate, and a clear fluid, which, however, may be removed by filtration. The acid which then remains on the filter forms, when dry, a transparent, polished varnish.

This acid may be decomposed into bilinic and cholinic acids by dissolving it in carbonate of soda, precipitating the solution by sulphuric acid added in considerable excess, and filtering, in order to separate the precipitated acids. A portion of bilin remains dissolved in the liquor, combined with sulphuric acid, and may be separated. The precipitate is a mixture of bilicholinic acid with

free cholinic acid. The former yields a soluble salt with barytic water, the latter an insoluble salt; these are separated by filtration. The undissolved barytic salt is treated with alcohol, which extracts a small quantity of fellinic acid, formed by the action of the sulphuric acid on the bilin; cholinic acid is then obtained from the undissolved cholate of barytes as before directed.

The bilicholinic acid is disengaged from the soluble barytic salt, and again submitted to similar treatment; which, however, produces no result, and is only mentioned for the purpose of showing what this acid is, and how it may be decomposed into bilinic and cholinic acids. From old gall sometimes cholic acid may be obtained.

I have previously mentioned the treatment of the plastic combination of lead with alcohol, and then with carbonate of soda: I shall now state how it may be treated, at the commencement, with carbonate of soda, without the application of alcohol.

It is first decomposed, at a high temperature, with carbonate of soda, which is then removed by filtration, as it generally contains oxide of lead in solution. This occurs, because the free oxide of lead having taken up the carbonic acid of the soda, thereby becomes dissolved. This oxide of lead may be completely separated by carbonate of ammonia, which must be added to the soda previous to the addition of oxide of lead during the process, and the excess of which is removed by boiling.

The filtered solution of soda is concentrated, and the water employed for washing the carbonate of lead evaporated, in order to mix it with the alkaline solution, which is then precipitated by sulphuric acid, and diluted with double its volume of water. This dilute acid is gradually added until the liquid ceases to become turbid, for which purpose it is required in excess. This operation is best executed in the vessel wherein it is intended to treat the bilifellinic acid with ether. The turbid mixture is thoroughly agitated, when a terebinthinate mass collects, adhering to the side of the glass vessel, and leaving the liquor almost clear. On this occasion the sulphuric acid takes up a considerable portion of bilin, which dissolves in the acid liquid, and a combination much richer in the acids contained in gall is precipitated. The acid liquid is decanted, and freed from its milkiness by filtration. It will become clear after about twelve to twenty-four hours if left by itself, but in this case partial decomposition of the bilin is to be apprehended.

A small portion of the filtered liquor is tested with sulphuric acid; if it is precipitated by the latter, then another still smaller portion by water: should this not become turbid thereby, too much sulphuric acid has been added, which easily dissolves a small portion of bilifellinic acid, and which may be again disengaged by dilution with water.

The acid liquor is saturated with pure carbonate of lead in the

recently precipitated state; common carbonate of lead, or white lead, may, however, be substituted, unless it contains acetate of lead. The operation succeeds, also, with carbonate of barytes, and with carbonate of lime; this latter I employed very frequently. As soon as the liquor is perfectly neutral, as indicated by its no longer reddening litmus paper, it is filtered, evaporated over a small quantity of recently precipitated oxide of lead, again separated from this by filtration, concentrated by heat, and the bilin contained in the residue separated from the sulphate of soda by anhydrous alcohol, which leaves the latter undisturbed.

The addition of oxide of lead during evaporation is intended to remove a portion of bilifellinic acid, which might perhaps be contained in the liquor in the form of dissolved neutral bilifellinate of lead, a salt soluble in anhydrous alcohol.

By this method bilin may be obtained quite pure, and in no very inconsiderable quantity.

The acid liquid is allowed to drip from the turpentine-like mass precipitated by sulphuric acid, which is then dissolved in a little water, forming a thin syrup, (a large quantity of water frequently makes it turbid and milky), and this syrupy liquid is treated with ether in the manner previously stated, when a solution of the acids of gall in ether, and a solution of bilin containing sulphuric acid, are obtained. These are both treated in the manner fully described in the preceding remarks, and which must be repeated several times.

By these repetitions we at last arrive at that point, previously mentioned, when ether no longer disengages any liquor containing bilin, but leaves a magma, which yields a salt with barytes easily soluble in water, and which is either pure bilicholinic acid, or contains a mixture of bilicholinic acid, according as the latter may have been contained in the gall or not.

The analysis of gall by sulphuric acid was the earliest method employed. We now fully understand that this is not a true analysis, but gives rise to partial decomposition of the principal element of gall, bilin; it may, however, be successfully employed for separating the component parts of gall from the extract dissolved in water.

If the gall was quite fresh, sulphuric acid oftentimes produces no precipitate therefrom, whatever quantity be added, and even if added after twenty-four hours, provided the mixture be not heated. This is the case both with the alcoholic extract and with fresh gall, from which the mucous matter has been previously precipitated by a small quantity of dilute sulphuric acid. Specimens of any other gall instantly become turbid by the action of sulphuric acid. All gall yields, however, a precipitate when a certain quantity of sulphuric acid is mixed with it, and the mixture heated to from 140° F. to 176° F.; which, gradually in-



creasing in quantity, forms a green turpentine-like layer of bilifellinic acid and bilicholinic acid. When the action has continued for a certain time, a fatty substance separates and floats on the surface, which, when cool, solidifies and crystallizes, when it may be easily removed. It consists chiefly of cholesterine, which, when the bilin has been destroyed by an acid, becomes insoluble in the solution, and then collects on the surface.

If, after having precipitated a certain portion of bilifellinic acid from the liquor, the latter is allowed to cool, some more bilifellinic acid is precipitated; and the liquor, after filtration, is then treated with carbonate of lead or potassa, and then, with moist oxide of lead, in the way before mentioned, bilin is obtained, but very coloured and impure. The deposited turpentine-like mass yields, when treated with ether, after the previously mentioned manner of separating the component parts, a similar product; the purifying of which, however, causes greater difficulty, on account of the more copious admixture of fat acids, which, however, in consequence of their free solubility in small quantities of ether, may be separated easily enough, but with difficulty from those matters contained in acids peculiar to gall. The separation of biliverdin, and the peculiar acid of bilifulvin, occasions the greatest difficulty. We shall return to them, however, further on.

These inconveniences, however, only concern those products which are obtained by the first operation; those afterwards obtained from the lead, in combination with the liquid bilin treated with ether, are in the same state as when obtained by the previously mentioned method of treatment, after their taurin has been properly separated.

If the sulphuric acid is allowed to act for a much longer time on the alcoholic extract of gall dissolved in water, the acid liquor finally loses all its bilin, in place of which it then contains taurin, and the disengaged substance becomes solid when cooled, does not dissolve in water, or merely in very small proportion, but may be dissolved completely in alcohol, even if the latter be dilute; or, perhaps, leaving behind a body nearly insoluble in it, dyslysin; and if the action is allowed to continue for some time longer, by concentrating the acid the whole contents will be converted into dyslysin.

[To be continued.]

#### ART. V.—*On Bricks which float on Water like Cork.* By EHRENBURG.

THE historian Posidonius, and subsequently Strabo, report, that there existed in Spain an aluminous earth, used for polishing silver, and from which bricks were formed, which floated in water. Vitruvius Pollio, the Roman architect, speaks of these stones, recommending them as a peculiarly appropriate material.

for building, on account of their lightness. Pliny also mentions a pumice-like earth as possessing these properties.

In the year 1791, an Italian, Giovanni Fabroni, renewed the subject, and enlarged our knowledge on this matter by making the experiment of forming bricks from a siliceous earth which occurs near Santafore, in Tuscany; and, indeed, he succeeded in forming bricks of such lightness that they floated on water. They also united well with mortar, and completely resisted the softening effects of water. These bricks were such bad conductors of heat, that they might be held by one end in the hand, whilst the other was red hot. He made a further experiment, by constructing a quadrangular cage of these bricks on an old vessel, and filled it with gunpowder. The vessel was then set fire to, which burned until the bottom of the powder magazine was consumed, with the whole of the wood, when the latter went down, without causing the ignition of the powder. His treatise, *Di una singolarissima specie di Mattoni*, was read in the academy at Florence, and printed in several Italian periodicals and other publications.

At that time, M. Faujas likewise observed a peculiar species of earth near Coiron, in France, not far from the Rhone, and Fabroni, when present at Paris, found that this latter had precisely the same properties as the mountain dust which he employed in Italy for the purpose of forming the before-mentioned light bricks. M. Faujas was therefore directed, by the minister of war, to submit this earth, and the spot where it occurred, to repeated and close examinations. It has, however, for some reasons to us unknown, never come into general use.

In the year 1832, the Count Français de Nantes reminded his countrymen of the discovery of Fabroni, through the medium of the *Journal des Connaissances*; adding, "Il est fort à souhaiter que l'on cherche, et que l'on découvre en France, cette substance blanche et pulvérulente commune en Toscane, et connue sous le nom de Farine fossile. Avec cette poussière on fabrique des tuiles inaltérables et éternelles qui surnagent sur l'eau, et je puis en montrer quelques unes qui furent faites il y a deux mille ans."

In consequence of this, M. Tournet, of Lyons, published in the same year a paper, "Notice sur la silice gélatineuse de Ceyssat, près de Pont-Gibaut, département de Puy de Dome, et sur son emploi dans les Arts," showing the equality of this earth with the Italian, and confirming the properties stated by Fabroni, and its technical utility and importance.

M. Tournet found that bricks, formed of this earth and baked, may easily be divided with a knife; and, therefore, may well serve as moulds for casting metal, since the cast may easily be detached, and the moulds made of any size. He further recom-

mends this siliceous earth for use in glass-works, instead of sand, as it saves fuel; and also for porous cooling vessels in hot climates, as they may easily be purified by heating to redness. Coated with tallow or wax these stones floated on the water. He further adds, "It will easily be perceived what great advantages so light a substance may yield to the navy. The powder-magazine, the kitchen, *the hearths of steam-engines*, places where spirits are kept, and those where red-hot balls might by any possibility enter, may be secured by them. It is of equal importance for the arched roofs of melting furnaces, and all furnaces where a high temperature is required, as the bricks do not melt, and contract only very slightly."

Afterwards Count Montlosier also found this earth on his estate of Prandamme; and Signor Leopoldo Pelli-Fabroni, at Florence, in the year 1838, directed the attention of the public again to the application of these stones for preventing fires. Besides this, it appears that the same material has been for a long time used in Greece, as the royal collection of minerals at Berlin contains a quantity of this mountain flour, from the collection of the late chymist Klaproth, labelled *Πλακοφόρος*, obviously signifying "furnace-mortar."

This species of earth was generally considered as inorganic, and being discovered only fortuitously, its technical use could not extend very far.

M. Ehrenberg has in his possession the most renowned of these different earths of Italy, France, and Greece, and for several years has been occupied in submitting them to rigid examination, and communicated in the year 1836 to the Academy that the earths from Santafiora, Ceyssat, and Zante, owe their peculiarities to the fact of their being an accumulation of small siliceous shells from invisible infusoria. The recent progress in the knowledge of the influence of infusoria directed his attention to their technical application, and as the utility of the infusorian clay (*ἡ ἀρλλώδης*) has been recommended by many practical men, the writer thinks it proper to advert to the occasion which arises in this metropolis (Berlin), as well as may probably occur in all the subfluvial basins and low shores of Germany, and perhaps of other countries, to examine, in a scientific manner, with a view to the practical application of the same.

The very thick layer of infusoria underneath the houses of Berlin, on the borders of the Spree, is, when recently dug out, of a silver grey; when dry, white, like pipe-clay, of the same quality as the Italian and the French, but considerably thicker and more extensive. With the kind assistance of the director of the Royal Porcelain Manufactory of Berlin, Mr. Trick, the writer caused some bricks to be prepared, samples of

which he presented to the Academy. A common brick weighs from seven to eight pounds and upwards; a brick from the Berlin infusoria clay weighs less than two pounds. Coated with wax it floats on water like cork. The strongest fire of a porcelain furnace does not melt them, and only contracts them slightly. By the addition of some clay or loam, their solidity becomes equal to that of common bricks, perhaps even superior, whilst their weight is not increased to half their density. Their further use for polishing, moulding, lining fire-places, especially those which are exposed to a strong heat, for fire-proof walls between houses, for constructing stone fire-proof rooms, or foundations in vessels, or for vaults and covers inside buildings which are required to be of moderate weight, may perhaps soon bring them into use, to a certain extent, in Germany, Sweden, Finland, and the North of America, if judiciously applied.—*From the Ber. d. Berliner Academie.*

## CHYMISTRY APPLIED TO AGRICULTURE.

### ART. VI.—*On the Humus contained in Arable Land.* By R. HERMANN.

RESPECTING the composition of arable land, the author (Mr. Hermann) reminds us of his analyses of *ichornasem*, and arable land taken from a spot in Russia which never had been touched by the plough; as also a second sample of land not far off from the former, which, in consequence of long cultivation without manure, had lost a great deal of its fertility. The first specimen the author distinguishes by A, the second by B.

100 parts of each specimen consisted of—

|                      | A.     | B.     |
|----------------------|--------|--------|
| Sand,                | 89.58  | 91.35  |
| Clay, and            |        |        |
| Phosphoric acid      |        |        |
| Ligneous humic acid  | 1.77   | 0.78   |
| Humus extractive     | 3.10   | 2.20   |
| Turf apocrenic* acid | 1.77   | 2.34   |
| Humus crenic acid    | 2.12   | 1.67   |
| Turf crenic acid     |        |        |
| Nitrolin . . .       | 1.66   | 1.66   |
| Humin . . .          |        |        |
| Vegetable residue    |        |        |
|                      | 100.00 | 100.00 |

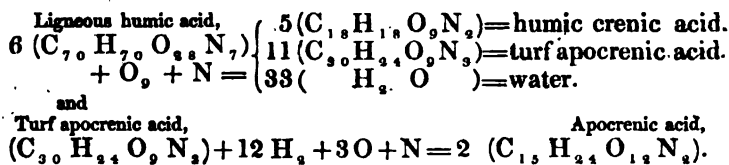
\* Literally, turf deposit acid, humus spring acid, turf spring acid.

The organic elements contained therein soluble in alkalies, or the humus of the soil, therefore consisted, in 100 parts, of

|                     | A.     | B.     |
|---------------------|--------|--------|
| Ligneous humic acid | 20.0   | 11.1   |
| Humus extractive.   | 36.0   | 31.7   |
| Turf apocrenic acid | 20.0   | 33.3   |
| Humus crenic acid   | 24.0   | 23.9   |
| Turf crenic acid.   |        |        |
|                     | 100.00 | 100.00 |

Comparing now the proportions of the composition of earthy humus with those of wood humus, we clearly perceive how the latter gradually disappears, whilst turf apocrenic and turf crenic acids take its place. This phenomenon may be explained by taking into consideration that ligneous humic acid is converted, by the simultaneous action of bases and the atmosphere, into turf apocrenic acid, and that the turf apocrenic acid becoming oxidised under the same influence, is converted into turf crenic acid.

The formulæ according to which these changes take place are as follows:—



It remains therefore to prove that in this case the circumstances under which these changes ensue take place during the formation of soil.

The organic elements of the soil are formed chiefly from vegetable residue, and therefore the principal element of these residua is wood. The wood is decomposed by the simultaneous action of air and moisture, being converted into nitrolin.

Nitrolin changes, by the continued action of air and moisture, into ligneous humus, a combination of ligneous humic acid, humus extractive, and ammonia.

Ligneous humus, having lost its coherence, is a loose powder mixed with sand and clay: it forms garden mould. The minerals composing the sand, especially field-spar contained therein, decay by the action of the atmosphere and potassa, which then become free. This and the bases contained in clay, especially lime, magnesia, alumina, and oxide of iron, act on the vegetable humus, disposing the ligneous humic acid therein contained to be converted into humus crenic acid, by yielding to it the

watery constituents, whilst it absorbs still more azote and oxygen from the air. By a continuation of these influences the turf apocrenic acid also oxidates, and produces turf crenic acid.

Thus the humus of the soil is produced from ligneous humus, and field earth from garden mould.

Taking into consideration also that the ligneous humic acid readily oxidates, but the turf apocrenic acid much less readily—that the decomposing acids scarcely dissolve at all in water, and produce almost insoluble combinations with the earthy and metallic bases, whilst, on the other hand, the humus extractive and the crenic acids chiefly dissolve in water, and, with the previously mentioned bases, likewise produce much more readily soluble combinations—it becomes evident that in field-earth, which is continually cultivated without having its organic elements renewed by manuring, turf apocrenic acid must collect, whilst the humus extractive and the crenic acids diminish, because they are dissolved by the water, and absorbed by the plants.

These observations lead, besides the above conclusions, to this axiom—that field-earth is the more fertile the nearer the humus contracted therein resembles ligneous humus, and that it is the more sterile in proportion as the turf apocrenic acid preponderates in the humus contained therein.

#### ON THE HUMUS CONTAINED IN TURF AND PEAT.

The chief part of turf, as well as of peat, is insoluble in alkalies, and consists of mouldering carbon of different composition. It is produced by the process of formation of coal, a change of wood, with the exclusion of the influence of the air, during which, besides carbonic acid, marsh-gas is also evolved. As, however, during this process the atmospheric air cannot easily be completely prevented from having access, a greater or lesser quantity of humus composed of similar approximating elements to wood and field humus is formed, both during the formation of turf coal and of peat.

One specimen of turf from the neighbourhood of Moscow consisted of—

|                      |   |             |
|----------------------|---|-------------|
| Mouldering coal .    | } | 77.50       |
| Nitrolin . . . .     |   |             |
| Vegetable residua    |   |             |
| Ligneous humic acid  |   | 17.00       |
| Humus extractive .   |   | 4.00        |
| Ammonia . . . . .    |   | 0.25        |
| Crenic acids . . . . |   | some traces |
| Ashes . . . . .      |   | 1.25        |
|                      |   | <hr/>       |
|                      |   | 100.00      |

Another specimen contained—

|                   |   |       |
|-------------------|---|-------|
| Mouldering coal   | } | 80.0  |
| Vegetable residua |   |       |
| Apocrenic acid    | } | 17.0  |
| Antro-apocrenic   |   |       |
| Turf crenic acid  | } | 1.0   |
| Antro-crenic acid |   |       |
| Ashes . . . . .   |   | 2.0   |
|                   |   | <hr/> |
|                   |   | 100.0 |

Another specimen of turf contained, besides mouldering coal and vegetable residua, humus of the composition of field-humus; that is to say, a humus consisting of ligneous humic acid, humus extractive, turf apocrenic acid, and crenic acid.

Peat from the district of Moscow contained only some traces of humus, which, for the greater part, consisted of turf apocrenic acid.

Of another peat from the neighbourhood of Moscow, those parts insoluble in alkalis, and which had a glittering lustre when broken, consisted, after deducting  $2\frac{1}{2}$  per cent. for ashes, of—

|                                   |       |
|-----------------------------------|-------|
| Carbon . . . . .                  | 62.8  |
| Hydrogen . . . . .                | 4.9   |
| Oxygen, with some traces of azote | 32.3  |
|                                   | <hr/> |
|                                   | 100.0 |

[To be continued.]

#### ART. VII.—*Remedy for Chilblains.*

A common remedy for chilblains among the peasants in Russia is the rind of perfectly-ripe cucumbers, dried with the soft parts attached, and placed with the inner side, previously soaked in warm water, over the sore parts. Dmitrieffsky confirms the efficacy of this remedy.—*Medic. Zeitung.*

#### ART. VIII.—*A Table of the Equivalents of the Substances commonly employed as Manure.*

THE following table, by M. Payen, which we extract from the *Provincial Medical Journal*, exhibits a view of the equivalents of the substances commonly employed as manure:—

| Substances.                         |                         | Nitrogen<br>per 1000. | Equiva-<br>lents. | Substances.                          |                        | Nitrogen<br>per 1000. | Equiva-<br>lents. |
|-------------------------------------|-------------------------|-----------------------|-------------------|--------------------------------------|------------------------|-----------------------|-------------------|
| Stable Manure                       | Pess                    | 17.9                  | 2223              | Blood                                | Dry, soluble           | 121.8                 | 328               |
|                                     | Millet                  | 7.8                   | 5128              |                                      | Fluid                  | 27.1                  | 1474              |
| Straw                               | Buck Wheat              | 4.8                   | 8333              |                                      | Coagulated and pressed | 45.1                  | 886               |
|                                     | Lentil                  | 10.1                  | 3960              |                                      | Insoluble and dry      | 148.7                 | 269               |
|                                     | Oats                    | 2.8                   | 14285             | Feathers                             |                        | 153.4                 | 260               |
|                                     | Barley                  | 2.3                   | 17390             | Cow hair                             |                        | 137.8                 | 290               |
|                                     | Rye                     | 1.7                   | 23529             | Woollen rags                         |                        | 179.8                 | 222               |
|                                     | Wheat                   | 4.9                   | 8160              | Beet root (worked)                   |                        | 0.9                   | 41365             |
| Lower part (0.67) of the straw      |                         | 4.1                   | 9750              | Cakes of                             | Linseed                | 52.0                  | 769               |
| Upper part (0.33)                   |                         | 13.3                  | 3000              |                                      | Colzaeed               | 49.2                  | 813               |
| Wheaten chaff                       |                         | 8.5                   | 4700              |                                      | Arachyahypogea         | 83.3                  | 462               |
| Dried stalks of Jerusalem artichoke | Madia                   | 5.7                   | 7010              |                                      | Madia                  | 50.6                  | 790               |
|                                     | Beet                    | 5.0                   | 8000              | Croton                               |                        | 40.2                  | 993               |
| Top leaves of                       | Potato                  | 5.5                   | 7272              | Pulp of potato                       |                        | 5.3                   | 7600              |
|                                     | Carrot                  | 8.5                   | 4700              | Juices of potato                     |                        | 3.8                   | 10638             |
|                                     | Field weeds             | 5.3                   | 7547              | Saw-dust                             | Acacia                 | 2.9                   | 67459             |
|                                     | Furze, leaves and stalk | 12.2                  | 3278              | Oak                                  |                        | 5.4                   | 13790             |
| Autumn leaves of                    | Oak                     | 11.7                  | 2777              | Solid excrement of cow               |                        | 3.2                   | 12500             |
|                                     | Beech                   | 5.3                   | 7434              | " " horse                            |                        | 5.5                   | 7270              |
|                                     | Poplar                  |                       |                   | Urine                                | Cow                    | 4.4                   | 9090              |
|                                     | Acacia                  |                       |                   |                                      | Horse                  | 2.6                   | 1530              |
|                                     | Pear-tree               |                       |                   | Mixed excrement                      | Cow                    | 4.1                   | 9750              |
|                                     | Heath                   | 17.4                  | 2290              |                                      | Horse                  | 7.4                   | 5400              |
| Fucus digitatus                     |                         | 8.6                   | 4650              |                                      | Pig                    | 6.3                   | 6240              |
|                                     |                         | 9.5                   | 4211              |                                      | Sheep                  | 11.1                  | 3600              |
| " Sacchar. sic.                     |                         | 13.8                  | 2890              |                                      | Goat                   | 21.6                  | 1850              |
|                                     |                         | 5.4                   | 7400              | Common guano                         |                        | 49.7                  | 804               |
| Brewers' grains                     |                         | 45.1                  | 880               | Purified guano                       |                        | 53.9                  | 741               |
| Clover root                         |                         | 1.6                   | 24800             | Colombine                            |                        | 83.0                  | 480               |
| Lupin seeds                         |                         | 34.9                  | 1140              | Litter from the silk worm            |                        | 32.90                 | 1215              |
| Grape husks                         |                         | 18.3                  | 2185              | Their ohrysalides                    |                        | 19.14                 | 2061              |
| Pulp of beet root (dry)             |                         | 11.4                  | 3500              | Prepared human faeces (Bel-<br>loni) |                        | 35.3                  | 1020              |
| " " (pressed)                       |                         | 3.8                   | 10580             | Ditto ditto (Monfaucou)              |                        | 15.6                  | 2560              |
| Oyster shells                       |                         | 3.2                   | 12500             | Horn scrapings                       |                        | 143.6                 | 278               |
| Burned sea weed                     |                         | 3.8                   | 10526             | Cockchaffers                         |                        | 32.1                  | 1270              |
| Soot                                | Coal                    | 13.5                  | 2962              | " Melted                             |                        | 70.2                  | 570               |
| " Wood                              |                         | 11.5                  | 3478              | Bones                                | Moist                  | 53.1                  | 643               |
| River mud                           |                         | 4.0                   | 10000             | " Fat                                |                        | 62.1                  | 574               |
| Marl                                |                         | 5.1                   | 7810              | Residue of bone glue                 |                        | 5.2                   | 7575              |
| Picardy Cinders                     |                         | 6.5                   | 6150              | Kitchen stuff                        |                        | 118.7                 | 336               |
| Dried muscular flesh                |                         | 130.4                 | 306               | Refiners' black                      |                        | 10.6                  | 3770              |
| Salt cod                            |                         | 67.0                  | 597               | Animal black                         |                        | 10.9                  | 3669              |
| " washed and pressed                |                         | 168.6                 | 237               | Limestones                           | Limogne                | 3.2                   | 12612             |
|                                     |                         |                       |                   |                                      | Marville               | 2.2                   | 19274             |
|                                     |                         |                       |                   |                                      | Boulbene               | 0.7                   | 55172             |

The exact values of the different articles mentioned in the above table were determined by analysis which I made for the purpose. It will be necessary, however, to say a few words in explanation of the table.

In the first column you will find the name of the substance employed as manure; in the second column the quantity of



nitrogen contained in 1000 parts of the material; and in the third the number of kilogrammes\* required to manure a hectare†.

Our common stable manure has been placed at the head of the table, and taken as a standard. It requires 10,000 kilos. to manure two acres and a half; or, in other words, 10,000 kilos. of a material, which contains four per 1000 of nitrogen, will manure the hectare (2·471 English acres) of ground. The standard, then, is a hectare, manured with 10,000 kilos. of matter, containing four per 1000 of nitrogen. Thus, 5000 kilos. of a substance containing eight per 1000 would produce the same results, and so on.

## PRACTICAL PHARMACY.

### ART. IX.—*Alloxane*.

"It would be most interesting to investigate the action of Alloxane on the human body. Two or three drachms, in crystals, had no injurious action on rabbits, to which it was given. In man, a large dose appeared to act only on the kidneys. In certain diseases of the liver, alloxane would very probably be found a most powerful remedy."—*J. C. Liebig's Organic Chemistry*, p. 156.

Such being the deliberately expressed opinion of Liebig, we have only to put our readers in possession of a formula for preparing alloxane, reminding them that at page 181 of this journal the preparation of Urea is fully detailed. We trust that several may be induced to prepare this remedy, and we shall be happy to assist such investigators by giving publicity to their researches.

WÖHLER and Liebig employed the following process for preparing alloxane:—The most concentrated fuming nitric acid is mixed with the ordinary acid of commerce, so as to form a liquid having a sp. gr. from 1·45 to 1·5. This mixture is put into a very shallow porcelain evaporating basin, and then is added to it, by little and little at a time, half its weight of dry uric acid; every portion added being mixed very carefully with the nitric acid. On every addition an effervescence takes place, and care must be taken to wait till the effervescence is over, and the liquid cold, before any more of the uric acid be added.

By this process we obtain a mass almost solid, consisting of brilliant and transparent crystals. It is poured upon a very porous brick or upon blotting paper. In twenty-four hours the liquid portion is removed, and there remains a dry white powder, easily purified by repeated crystallizations. It is mixed with its own weight of water in a porcelain capsule, and heated till complete solution takes place. The solution being filtered and left in a warm place, colourless transparent crystals, having the diamond lustre and considerable bulk, are gradually

\* The kilogramme is equivalent to 2·205 pounds avoirdupois.

† The hectare to 2·471 acres English.

deposited. These crystals constitute *alloxane* in a state of purity.

Alloxane was analyzed with much care in Liebig's laboratory. The atoms of carbon were to those of azote as 4 : 1. The mean of five analyses, made with oxide of copper, gave—

|          |                     |      |              |       |
|----------|---------------------|------|--------------|-------|
| Carbon . | 30.22 or 8 atoms =  | 6    | or per cent. | 30    |
| Hydrogen | 2.54 or 4 atoms =   | 0.5  | „            | 2.5   |
| Azote .  | 17.63 or 2 atoms =  | 3.5  | „            | 17.5  |
| Oxygen . | 49.61 or 10 atoms = | 10.0 | „            | 50.0  |
|          | <hr/>               |      |              | <hr/> |
|          | 100.00              | 20.0 |              | 100.  |

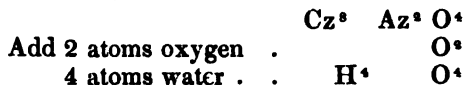
The theoretic constitution, or  $C^8 H^4 Az^2 O^{10}$ , corresponds very well with the analysis.

The composition of alloxane being known, it is easy to explain its formation by the action of nitric acid on uric acid.

It has been already stated that uric acid may be considered as a compound of an unknown acid and urea.



The urea is disengaged, and there remains the acid,



which is an atom of alloxane.

*Thomson's Chymistry of Animal Bodies.*

ART. X.—By M. TANNASCH, *Pharmaceutical Chymist at Barby.*

#### SUCCUS GLYCYRRHIZÆ DEPURATUS.

AMONG the various modes of purifying the Succ. Glycyrrh dep. with which I am acquainted, there is none which yields a plentiful product with little trouble. I think, however, that the process followed by myself, which I am about to narrate, fulfils both conditions. A common sugar mould and a receiving vessel (a vessel placed beneath), is the apparatus which I require for this process of purification, and which is performed in the following manner:—The vent-hole of the mould is closed by means of a stopper, and there is placed inside some coarse tow. Over this long straw is placed crossways, in layers of about one inch each, and the commercial liquorice is then placed upright, closely packed in the mould, together with chopped straw, cut in somewhat long pieces; and this arrangement is completed to within two fingers' breadth of the brim. A sufficient quan-

tity of water is then poured over the mass, which is allowed to stand for twenty-four hours, when the vent-hole is opened, and a clear concentrated solution is obtained. In order to obtain a solution still stronger, without being obliged to adopt the slow course of evaporation, the first solution is returned into the mould, and allowed to stand for another twenty-four hours before it is finally drawn off. Water is again poured over the residue, and allowed to stand, in order to extract completely the soluble parts, after which the insoluble parts will be found in the mould in the same shape as the liquorice previously existed therein. From 8 lbs. of Bayonne liquorice I obtained nearly 6 lbs. of succ. dep., which might be perfectly dissolved, forming a bright solution, in water.\*

#### EXTRACT CINCHONÆ FR. PAR.

In a pharmaceutical journal the mode of displacement has been suggested for preparing the Extr. Cinchonæ fr. par.; that is to say, by placing the powdered bark, in layers, in a sugar mould. I can recommend this mode of preparation very strongly, since it yields a very beautiful extract without much trouble. I was likewise entirely satisfied as to the quantity yielded, for I obtained  $11\frac{1}{2}$  ounces of extract, capable of redissolving into a clear solution, from 9 lbs. of Peruvian bark.

#### CONEINE.

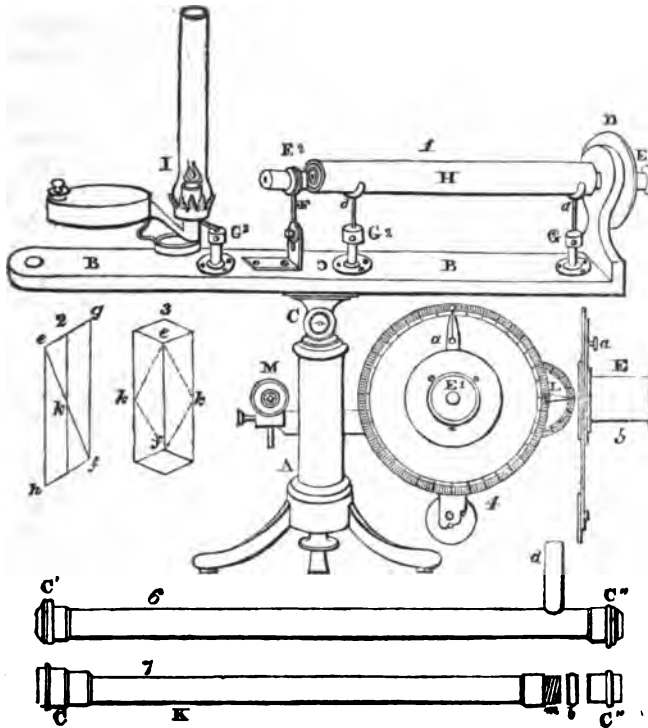
Last autumn I prepared Coneine according to the formula in *Geiger's Handbuch der Pharmacie*, when 5 lbs. of unripe seeds (umbels) yielded  $2\frac{1}{2}$  drachms of product.

*Archiv. d. Pharmacie*, lxxx. 1.

#### ART. XI.—*On the Application of Circular Polarization as a Re-agent.* By VENTZKE.

As a series of works by the above writer, Soubeiran, and others, on the optical properties of different bodies, are continually being offered in foreign journals, we will at once introduce a description of the apparatus the application of which has been recommended by Ventzke for experiments of polarization, and which possesses the following advantages over that of Biot:—First, that no mirror but a Nicol prism is employed; secondly, that the operation is executed by means of a constant artificial light, and not by the action of the ever-varying daylight of our climates; thirdly, that a permanently coloured liquid is given as the point of comparison. These advantages evidently outweigh the somewhat greater expense of this apparatus, which, at all events, may very easily be experimented with.

\* M. Brandes (one of the editors of the *Archiv. der Pharmacie*) here remarks, that the essential parts of this process have already been for some time followed by practical pharmacutists.



With any solid stand, A. fig. 1, you select a board B about 18 inches long, 2 inches broad, and  $\frac{1}{2}$  an inch thick. This is united by a joint C, so arranged that it may be placed at any convenient angle with the horizon. This board supports—

1. A wooden pillar, H, pierced in the middle, to which a round disk, D, is screwed; and to this a Nicol prism is fixed in the centre, as represented by E'. These prisms are, as is well known, prepared by grinding off a natural rhomboëd (fig. 2 and 3) of the Iceland doublespar, the cleavage planes of which, *ge* and *fh*, form an angle of above  $70^\circ$ , in such a manner that they then have an angle of  $68^\circ$ ; after which the rhomboëd, in a direction perpendicular to the chief cut of the crystal, and rectangular to the new end-planes, is cut as fig. 2. The natural size is represented in *e k f* in the side view, and fig. 3 in the front view. These oblique cut planes, being well polished, are again cemented together with Canada balsam, by which the desired effect is attained of destroying the second image almost entirely, and so as to turn it sufficiently aside that by the shading being

properly arranged, it is never seen. Ventzke thought it judicious to give a dead appearance by grinding the four long side-planes, and to cover them with a dead-black colour, which destroys the reflection.

This prism  $E^1$  is closely united with a turn-screw, so that it may be either turned to the right or the left around its axis, whilst the disk  $D$  remains invariable and unmoved. The latter is provided with a scale of degrees, so arranged that the  $^\circ$  stands perpendicularly above its centre, and  $180^\circ$  (= a semicircle) perpendicularly underneath.

2. A pillar  $F$ , on which a second Nicol prism  $E^2$  is so arranged in a frame that it may be turned in any way around its axis, yet, at the same time, on a certain point accurately fixed by an adjusting-screw.

3. Two shorter pillars  $G$  and  $G^2$ , supporting forks, which can be placed higher or lower, serving as supports for a tube  $H$ , the inside of which is covered with black velvet.

4. A pillar  $G^2$ , supporting a small Argand-lamp  $I$ , of ordinary construction. Its wick has a diameter of  $5''$ , about half an inch.

In the tube  $H$  strong glass-tubes  $K$ , fig. 16 and 17, about  $9\frac{1}{4}'''$  (from 7 to 8 millimetres =  $0.28$  to  $0.32$  of an inch  $E$ .) wide are placed, being of an accurately defined length, viz.  $234$  millimetres =  $9'' 10.97'''$  Germ. =  $9.36$  inch  $E$ . This length is invariably the same in all experiments. The tubes are closed above and beneath by glass plates; brass frames,  $C'$   $C''$ , which, by means of a small disk of cork, uniformly press against the glass plates when screwed on to them.

Figure 4 represents the scale with the prism  $E^1$  in front view. Figure 5, the same taken at a side view.

#### APPLICATION OF THE APPARATUS.

1. *Determination of the 0 Point.*—If a ray of light passes through a Nicol prism, and is then observed through another of the same kind by turning one of them around its centre, two points will be perceived in which the polarized light, as is well known, completely disappears. If the first point is marked 0, the second is diametrically opposite, or at a distance of  $180^\circ$  from the former. In the present case it is sufficient to fix one of these points.

For this purpose the first prism  $E^1$ , by means of a magnifying glass, and the foot  $a$  attached to it, is most accurately placed on 0 of the circular division, and the prism  $E^2$  is then turned until a transient ray entirely disappears. This operation can only be executed during the direct action of sun-light, for the result to be precise; since the least deviation from the plane of polarization, in which all light disappears, has instantly this effect, that a small portion of it passes through. This is, in the case of the very intense light of the sun, so evident, that the

really black point is confined to the narrowest limits. Its indication, therefore, is as exact as possible. If any other light should be employed, the indication of this point would be so uncertain, that every experiment would lose, for this simple reason alone, any claim as to precision, and must, therefore, be rejected *à priori*. The prism  $E^2$  is then immoveably fixed by an adjusting screw.

2. *Position of the Solutions.*—These must always be as clear and colourless as possible. It is true that coloured solutions may be examined to a certain degree of accuracy. Those which are turbid, however, prevent any indication whatever. In most cases graulated animal charcoal (previously freed from all soluble salts) is sufficient for removing any colour; and Ventzke employs for this purpose common testing-cylinders, of different diameters, having at the bottom a small opening, which may easily be closed by filtering paper, the tubes being filled with the said charcoal to three-fourths of their whole length. The liquor is thus filtered by displacement, whilst the space above is always kept full.

The indication of the specific gravity is then obtained with precision to at least its thousandth part. As the tubes hold only about  $\frac{1}{2}$  cub" (from 9 to 12 Cb. C. = 188·906 grains to 185·208 grains), Ventzke employs for this purpose small areometers of 5" (130 millimetres = 5·2 inch E.) length, yielding this advantage, that the operation may be executed with small quantities.

The under glass-plate being closely pressed by the screws,  $C''$  (fig. 6), the tube is filled in such a manner that the surface of the liquor has a slight convex elevation at  $m$ , after which the glass-plate  $b$  is pressed or shifted against it so that no air can enter into the tube. The frame  $C'$ , together with the cork disc contained therein, are then screwed on, and the outsides of the plates cleaned so far as is possible. Placed in the hollow cylinder  $H$  (fig. 1), the tube is then put on the support  $d$  in such a manner that the screw  $c'$  reaches into the centre opening of the post  $K$ , in order to touch the prism  $E^1$  closely. The holders  $d$  are directed, by their adjusting screws, in such a manner, that the axis of the prisms and the tube fall exactly in the same direction. This axis, if prolonged, should fall on the brightest part of the lamp  $I$ , which can likewise easily be heightened and lowered on the post  $G^2$ .

c. *Observation.*—The instrument stands, as presupposed, on the 0 point. By looking now through the  $E^1$  to the flame of the lamp, obscurity exists in case the colourless liquor does not produce any circular polarisation, as, for instance, in the case of pure water. If the contrary, it appears clear, and in the colour of the flame. The first prism  $E^1$  is then to be *turned to the right-hand side*. If colours appear in the following succession, clear

blue, dark blue, violet, purple, red, orange, the *polarization to the right-hand side* is undoubtedly ascertained; if this succession of colours appears by *turning E' to the left*, it is equally certain that the *circular polarization* takes place *to the left*. As soon as a red colour appears in the middle, between purple and orange, the degrees are read off which the indicator shows, reckoning from 0.

In order to catch this important point precisely by comparison, Ventzke places in M (fig. 4.) a small closed tube, likewise directed towards the flame. This is filled with a liquor which is unaffected by the influence of light and heat, always yielding the same tint of colour as is required for our purpose. Dr. Marchand succeeded in discovering that an aqueous solution of indigotate of peroxide of iron answers exceedingly well for this purpose. Only slight practice is necessary to ascertain the point where the tint of colour required is conformable with the constant colour of the solution.

3. *Experiments.*—In the following Table, the different kinds of sugar, in the real sense of the word,—that is to say, those directly or indirectly capable of vinous fermentation,—are arranged consecutively, so that those which polarize the most to the left commence the series, whilst those which show the greatest deviation to the right terminate the same. Other substances then follow, which stand in a certain relation to the different kinds of sugar and its combinations.

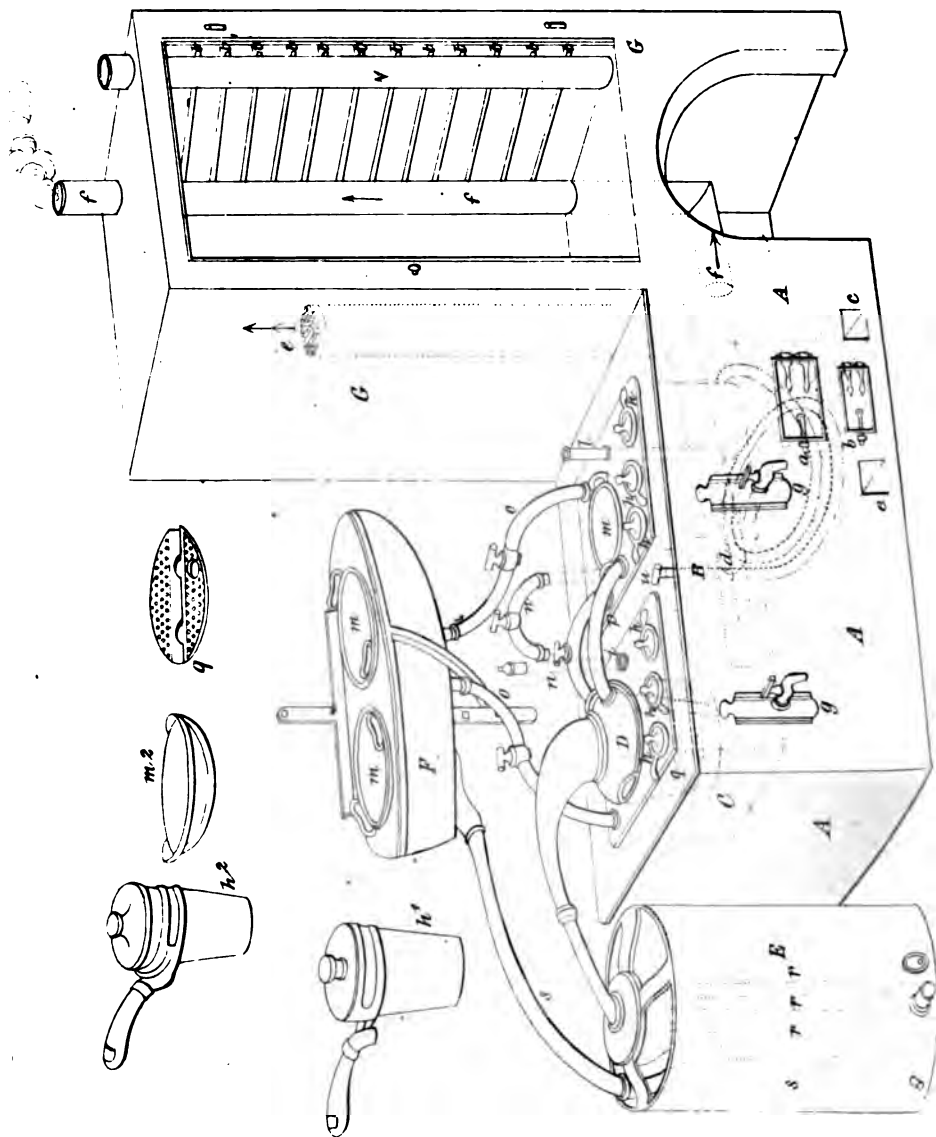
The length of the layer is in all cases 234 Mm. = 9·36 inch E.

| NAMES OF THE AQUEOUS SOLUTIONS<br>OF SUBSTANCES.   | Polarizes<br>degrees<br>(360 in the circle). |                 | Specific density at<br>17° C. = 63° F. | Per cent. of the sub-<br>stances dissolved<br>in the liquor. |
|----------------------------------------------------|----------------------------------------------|-----------------|----------------------------------------|--------------------------------------------------------------|
|                                                    | To<br>the right.                             | To<br>the left. |                                        |                                                              |
| 1. Fruit sugar from grapes . . .                   | 35½                                          | —               | 1·1056                                 | —                                                            |
| 2. " " honey . . .                                 | 36                                           | —               | 1·1056                                 | —                                                            |
| 3. " by the action of acids<br>on cane sugar . . . | 35½                                          | —               | 1·1056                                 | —                                                            |
| 4. " by fermentation from<br>cane sugar . . .      | 36                                           | —               | 1·1056                                 | —                                                            |
| 5. Syrup sugar . . .                               | 0                                            | 0               | 1·105                                  | —                                                            |
| 6. Sugar of milk . . .                             | —                                            | 43              | 1·102                                  | 25                                                           |
| 7. Grape sugar of every kind . . .                 | —                                            | 46              | 1·095                                  | 25                                                           |
| 8. Saccharo-chloride of sodium . . .               | —                                            | 41              | 1·117                                  | 25                                                           |
| 9. Cane sugar . . .                                | —                                            | 56              | 1·1056                                 | 25                                                           |
| 10. Dextrine sugar . . .                           | —                                            | 92              | 1·1056                                 | —                                                            |
| 11. Dextrine . . .                                 | —                                            | 19              | 1·011                                  | 3·36                                                         |
| 12. " by calculation . . .                         | —                                            | 140             | —                                      | 25                                                           |

The sugar from manna, liquorice, glycerin, glue, gum, starch, caramel, glucinic acid, saccharo-potassa, and apoglucin, with their salts, alcohol, acetic acid, chloride of sodium, altogether, did not indicate any circular polarization. If substances which







polarize to the right and to the left are met with admixed, so that no change of colours is perceptible on either side, their power of circular polarization may, however, be observed by the circumstance that in the 0 point no obscuration takes place, but they appear bright.

It is a fact of great importance that syrup sugar does not polarize at all. We are not able to produce pure syrup sugar by treating cane sugar with spirit of wine: we may succeed, however, by continued boiling of a concentrated solution of cane sugar, in converting it to such a degree that it will no longer polarize. In case of a syrup which does not crystallize at all, boiling for twenty-four hours is quite sufficient for this purpose. The formation of syrup sugar is always accompanied by a colour. Trommer's copper test is not able to indicate the cane sugar in syrups where syrup sugar preponderates.

In the experiment with the sugar of urine mixed with common salt, it appears that the polarizing power of the solution is merely in proportion to its contents of free grape sugar. The writer has likewise observed, that urine undoubtedly contains sugar, notwithstanding this does not polarize. In this case the fermentative capability alone can decide the point.

*Jahrb. f. prakt. Chemie.*

#### ART. XII.—*Pharmaceutical Furnace.*

WE here give the description of an apparatus of the highest importance to the pharmaceutical chymist, the aptness of which, for executing most pharmaceutical operations, has been sufficiently proved by its introduction into a great number of laboratories.

A A A is the furnace; the fireplace being arranged at *a*, and, the ashpit at *b*. It contains an oblong tinned-copper boiler B, with a pipe for withdrawing its contents by the tap *g*, and a well-tinned cast-iron cover soldered to it, having round holes of different diameters and rims of tin rivetted to them, into which boxes of the same metal, *h h h h*, or earthenware *h*, are fitted by means of an iron ring. An evaporating basin of tin *m*, or of earthenware *m*, fits in the larger one: these basins may be provided with covers also when they serve for prolonged digestion. A small hole receives the tin tube *l*, reaching to within a couple of inches of the bottom of the boiler, and is open at both ends, which serves to indicate the height of water in the boiler, whilst it does not evolve steam, on account of its being under water. So soon, however, as it evolves steam rapidly the water is beneath its lower end, and must then be replenished. This boiler by the tin tubes *n n* is in communication with another vessel C precisely similar, which is only heated by the steam evolving from the boiler B, provided the taps of the connecting pipes are turned on in such a way as to allow the necessary communication. This

second boiler contains, besides the vessels *h h h*, the tin still *D*, which has a double bottom of tin *q q* pierced with holes, and composed of two halves, which may be easily taken out, and has, at the side near the top, an opening, through which a bent tin tube *p* reaches from the first boiler to beneath the perforated false bottom. This arrangement is used for aqueous distillations, or preparing essential oils, in which case the boiler is not filled with water: the substance being simply cut into small pieces is placed in the dry state (in the case of oil of mustard seed, or oil of bitter almonds, the cake must be moistened) on the perforated false bottom, when the steam from the boiler *B* passes beneath the ingredients, and distils over impregnated with the volatile parts. The communication of steam to other places must then of course be prevented by closing the taps and setting the boxes, boilers, &c. into their places. If spirituous liquors are to be distilled, this arrangement requires the following modifications:—The perforated bottom is taken out, the liquors to be distilled put into the boiler, the tube removed, and the openings closed by plugs, as at *c*. The steam from the water heats the liquor from outside, and it distils quickly over. The distilling vessel is connected with the refrigerator *E*, containing one of Schroeder's cooling apparatuses somewhat modified: the three cooling tubes *r r r* discharge their contents into the lower main. All the different parts must be sufficiently well fitted to each other that no luting is required; the distillation is then carried on very easily; and although the still may be small, a considerable quantity can be distilled in a short time. The condensed water increasing in the boiler *C* can be let out, from time to time, by the tap *g*, and used for distilled water. The larger openings of both boilers may occasionally be used for admitting a thick tin ring with four openings for placing infusion pots, &c. therein. (The distilling vessel closed with a cover may, in like manner, serve as a digester for making extracts). Both boilers are further united by the two tubes *o o* provided with taps, and connected with the well-tinned copper vessel *F* used for heating and evaporating, and which contains similar basins for digesting and evaporating, as have been already described and figured *m m*, and smaller basins for softening plasters, &c. (perhaps also vessels for infusions). The apparatus is provided with a third tube *s s*, which passes through the refrigerator, in order to collect the condensed steam for use, as distilled water.

*G G* is the drying room connected with this apparatus. It is heated by hot air; *cc* are channels of cast iron, the sides of which are heated by the fire in the fire-place: they unite at *d* in a common channel which opens at *e* into the kiln, and thus heats it with dry and hot air. In order to lead away the saturated air, the pipe *v* opens into the drying-room at its lower extremity: this carries off the air charged with moisture with rapidity, and

effects a draught through the drying-room. *ff* is the chimney, which may also be conducted by means of an iron pipe through the drying-room to increase the temperature. The matters to be heated are either spread on the iron plate which forms the bottoms, or wire trays resting on the ledges *t t*.

[The preceding description is almost a literal transcript of Beindorff's apparatus, as it is termed, and, with the plate, has been taken from Liebig, Poggendorff, and Woehler's Dictionary of Chymistry; the modifications which we have ventured to introduce being principally with a view to the economical application of fuel, and more rapid heating of the water in the second boiler C. This is effected by a coil of pipe, *u*, which has two branches at the upper end; the one leading into the vessel C, the other into the corresponding boiler B, and the pipe being conducted so as to surround the burning fuel in the fire-place, resting on the channels *c c*, and terminating at the lower part of the boiler B. Now, when the boiler B is charged, necessarily this cast iron pipe is filled with the liquid, and, being in immediate contact with the fuel, the contents are rapidly and economically converted into steam, which, by a tap at *u*, may either be caused to circulate into the boiler B or C. For instance, when spirituous liquors are to be distilled from the vessel D, the steam formed in this pipe is directed by the tap at *u* directly into the vessel C, and rapidly heats the water; if, in lieu of performing this process, we are distilling by passing steam through dry ingredients resting on the perforator *g*, we then turn the tap so that the hot, and indeed high pressure steam generated in this coil of pipe may be conveyed, after passing through the fire, into the vessel whence it derives its supply of liquid B. We have found a saving of quite half by this arrangement, and therefore have deemed it worthy of mention. By causing the arms of the pipe *u* to enter the boiler lower down, the steam formed therein then enters the liquid before it is rendered available. This arrangement causes, however, severe succussions if the fire be intense. Perhaps, by being made to enter the boiler B near the top (above the liquid) and in the boiler C lower down (below the liquid), it would be an improvement, since in the first vessel we usually require steam, whilst in the second the object sought to be attained is the formation of a hot water bath. We may be allowed to state the above hint was gathered from Mr. Perkins's hot-water apparatus; and to that gentleman we would refer any parties who may wish to have the furnace pipe and its connections, with the boilers, properly arranged.

The above apparatus complete is sold in Germany for £40. We will not do our English artisans the injustice to suppose that they cannot compete with their continental brethren.]

| NOMINA.                          | FORMULÆ.                                                        |
|----------------------------------|-----------------------------------------------------------------|
| <i>Benzoas</i> Kalicus . . . . . | $\dot{\text{K}} \ddot{\text{Bz}}$ . . . . .                     |
| — Lithicus . . . . .             | $\dot{\text{L}} \ddot{\text{Bz}}$ . . . . .                     |
| — Magneticus . . . . .           | $\dot{\text{Mg}} \ddot{\text{Bz}}$ . . . . .                    |
| — Manganosus . . . . .           | $\dot{\text{Mn}} \ddot{\text{Bz}}$ . . . . .                    |
| — Molybdicus . . . . .           | $\dot{\text{Mo}} \ddot{\text{Bz}}^{\circ}$ . . . . .            |
|                                  | $\frac{1}{2}$ . . . . .                                         |
| — Molybdosus . . . . .           | $\dot{\text{Mo}} \ddot{\text{Bz}}$ . . . . .                    |
| — Naticus . . . . .              | $\dot{\text{Na}} \ddot{\text{Bz}}$ . . . . .                    |
| — Niccolicus . . . . .           | $\dot{\text{Ni}} \ddot{\text{Bz}}$ . . . . .                    |
| — Palladosus . . . . .           | $\dot{\text{Pd}} \ddot{\text{Bz}}$ . . . . .                    |
| — Platinosus . . . . .           | $\dot{\text{Pt}} \ddot{\text{Bz}}$ . . . . .                    |
| — Plumbicus . . . . .            | $\dot{\text{Pb}} \ddot{\text{Bz}}$ . . . . .                    |
| — — cum aqua . . . . .           | $\dot{\text{Bh}} \ddot{\text{Bz}} + \dot{\text{H}}_2$ . . . . . |
| — tri Plumbicus . . . . .        | $\dot{\text{Pb}}^{\circ} \ddot{\text{Bz}}$ . . . . .            |
| — Rhodicus . . . . .             | $\ddot{\text{R}}_2 \ddot{\text{Bz}}^{\circ}$ . . . . .          |
|                                  | $\frac{1}{2}$ . . . . .                                         |
| — Stannicus . . . . .            | $\ddot{\text{Sn}} \ddot{\text{Bz}}^{\circ}$ . . . . .           |
|                                  | $\frac{1}{2}$ . . . . .                                         |
| — Stannosus . . . . .            | $\ddot{\text{Sn}} \ddot{\text{Bz}}$ . . . . .                   |
| — Stibicus . . . . .             | $\ddot{\text{Sb}}_2 \ddot{\text{Bz}}^{\circ}$ . . . . .         |
|                                  | $\frac{1}{2}$ . . . . .                                         |
| — Stronticus . . . . .           | $\dot{\text{Sr}} \ddot{\text{Bz}}$ . . . . .                    |
| — Telluricus . . . . .           | $\ddot{\text{Te}} \ddot{\text{Bz}}^{\circ}$ . . . . .           |
|                                  | $\frac{1}{2}$ . . . . .                                         |
| — Thoricus . . . . .             | $\dot{\text{Th}} \ddot{\text{Bz}}$ . . . . .                    |
| — Uranicus . . . . .             | $\ddot{\text{U}}_2 \ddot{\text{Bz}}^{\circ}$ . . . . .          |
|                                  | $\frac{1}{2}$ . . . . .                                         |

| PONDERA ATOMORUM. |        | PARTES CENTESIMALES. |       |         |
|-------------------|--------|----------------------|-------|---------|
| O = 100           | H, = 1 | + E                  | — E   | H vel H |
| 2022,44           | 162,06 | 29,17                | 70,83 |         |
| 1612,86           | 129,24 | 11,18                | 88,82 |         |
| 1690,88           | 135,49 | 15,28                | 84,72 |         |
| 1878,41           | 150,52 | 23,74                | 76,26 |         |
| 3663,57           | 293,57 | 21,80                | 78,20 |         |
| 1881,78           | 146,78 |                      |       |         |
| 2181,04           | 170,76 | 32,78                | 67,22 |         |
| 1823,42           | 146,11 | 21,44                | 78,56 |         |
| 1902,20           | 152,43 | 24,69                | 75,31 |         |
| 2198,42           | 176,16 | 34,84                | 65,16 |         |
| 2766,02           | 221,64 | 48,21                | 51,79 |         |
| 2827,02           | 226,53 | 49,33                | 50,67 |         |
| 2989,50           | 235,54 | 47,44                | 48,73 | 8,83    |
| 5616,02           | 450,02 | 74,49                | 25,51 |         |
| 5900,34           | 472,80 | 27,16                | 72,84 |         |
| 1966,78           | 157,60 |                      |       |         |
| 3800,34           | 304,52 | 24,61                | 75,39 |         |
| 1900,17           | 152,26 |                      |       |         |
| 2267,82           | 181,72 | 36,83                | 63,17 |         |
| 6210,47           | 497,65 | 30,80                | 69,20 |         |
| 2070,16           | 165,88 |                      |       |         |
| 2079,81           | 166,66 | 31,12                | 68,88 |         |
| 3866,81           | 309,85 | 25,91                | 74,09 |         |
| 1933,40           | 154,93 |                      |       |         |
| 2277,42           | 182,49 | 37,10                | 62,90 |         |
| 10020,28          | 802,93 | 57,11                | 42,89 |         |
| 3340,09           | 267,64 |                      |       |         |

| NOMINA.                                      | FORMULÆ.                           |
|----------------------------------------------|------------------------------------|
| <i>Benzæos</i> Uranosus . . . . .            | $\dot{U} \ddot{B}z$ . . . . .      |
| — Vanadicus . . . . .                        | $\ddot{V} \ddot{B}z^s$ . . . . .   |
|                                              | $\frac{1}{2}$ . . . . .            |
| — Yttricus . . . . .                         | $\dot{Y} \ddot{B}z$ . . . . .      |
| — Zincicus . . . . .                         | $\dot{Z}n \ddot{B}z$ . . . . .     |
| — Zirconicus . . . . .                       | $\ddot{Z}r, \ddot{B}z^s$ . . . . . |
|                                              | $\frac{1}{2}$ . . . . .            |
| <i>Benzoylium</i> . . . . .                  | $\ddot{B}z = C^{14} H^{10} O^s$ .  |
| <i>Bismuthum</i> . . . . .                   | Bi . . . . .                       |
|                                              | $Bi_3$ . . . . .                   |
| <i>Boras</i> Aluminicus . . . . .            | $\ddot{Al}_3 \ddot{B}^s$ . . . . . |
| <i>bi Boras</i> Aluminicus . . . . .         | $\ddot{Al}_3 \ddot{B}^6$ . . . . . |
| <i>Boras</i> Ammonicus . . . . .             | $N_3 H_3 \ddot{B}$ . . . . .       |
| <i>bi Boras</i> Ammonicus . . . . .          | $N_3 H_3 \ddot{B}^s$ . . . . .     |
| — — — cum aqua . . . . .                     | $N_3 H_3 \ddot{B}^s + 4H_2$ .      |
| <i>quadri Boras</i> Ammonicus c. a. . . . .  | $N_3 H_3 \ddot{B}^s + 8H_2$ .      |
| <i>Boras</i> Ammonicus basicus . . . . .     | $3N_3 H_3 + 4\ddot{B} + 6H_2$ .    |
| <i>se Boras</i> Ammonicus cum aqua . . . . . | $N_3 H_3 \ddot{B}^6 + 9H_2$ .      |
| <i>Boras</i> Argenticus . . . . .            | $\dot{Ag} \ddot{B}$ . . . . .      |
| <i>bi Boras</i> Argenticus . . . . .         | $\dot{Ag} \ddot{B}^s$ . . . . .    |
| <i>Boras</i> Baryticus . . . . .             | $Ba \ddot{B}$ . . . . .            |
| <i>bi Boras</i> Baryticus . . . . .          | $Ba \ddot{B}^s$ . . . . .          |
| <i>quadri Boras</i> Baryticus . . . . .      | $Ba \ddot{B}^4$ . . . . .          |
| <i>Boras</i> Bismuthicus . . . . .           | $\dot{Bi} \ddot{B}$ . . . . .      |
| <i>bi Boras</i> Bismuthicus . . . . .        | $\dot{Bi} \ddot{B}^s$ . . . . .    |
| <i>Boras</i> Cadmicus . . . . .              | $\dot{Cd} \ddot{B}$ . . . . .      |

| PONDERA ATOMORUM. |                    | PARTES CENTESIMALES. |         |                      |
|-------------------|--------------------|----------------------|---------|----------------------|
| O = 100           | H <sub>a</sub> = 1 | + E                  | — E     | H vel H <sub>a</sub> |
| 4243,88           | 340,07             | 66,24                | 33,76   |                      |
| 3921,94           | 314,27             | 26,95                | 73,05   |                      |
| 1860,97           | 157,13             |                      |         |                      |
| 1935,04           | 155,05             | 25,97                | 74,03   |                      |
| 1935,75           | 155,11             | 26,00                | 74,00   |                      |
| 5437,97           | 435,75             | 20,97                | 79,03   |                      |
| 1812,66           | 145,25             |                      |         |                      |
| 1332,52           | 106,78             | Bz=84,99             | O=15,01 |                      |
|                   |                    | C=80,31              | O=15,01 | H=4,68               |
| 886,92            | 71,07              |                      |         |                      |
| 1773,84           | 142,14             |                      |         |                      |
| 1950,95           | 156,33             | 32,92                | 67,08   |                      |
| 3259,56           | 261,19             | 19,71                | 80,29   |                      |
| 763,16            | 61,16              | 42,84                | 57,16   |                      |
| 1199,36           | 96,11              | 27,26                | 72,74   |                      |
| 1649,28           | 132,16             | 19,82                | 52,90   | 27,28                |
| 2971,61           | 238,12             | 11,00                | 58,72   | 30,28                |
| 3400,66           | 272,49             | 28,84                | 51,31   | 19,85                |
| 3956,50           | 317,04             | 8,26                 | 66,15   | 25,59                |
| 1887,81           | 140,47             | 76,89                | 23,11   |                      |
| 2324,02           | 186,23             | 62,46                | 37,54   |                      |
| 1393,08           | 111,63             | 68,69                | 31,31   |                      |
| 1829,29           | 146,58             | 52,31                | 47,69   |                      |
| 2701,70           | 216,49             | 35,42                | 64,58   |                      |
| 1423,13           | 114,04             | 69,35                | 30,65   |                      |
| 1859,33           | 148,99             | 53,08                | 46,92   |                      |
| 1232,98           | 98,80              | 64,62                | 35,38   |                      |



## CRYSTALLIZED CREAM AND LIN. CAMPH.

*To the Editors of the Annals of Chymistry and Pharmacy.*

GENTLEMEN,—In answer to the query of a correspondent in your journal I find the following reply :—That you are not aware of such an article as Crystallized Cold Cream. There is a very elegant preparation called Crystallized Cream, which I have no doubt is what your correspondent refers to : it is made in the following manner :—

R. Ol. Amygdal. dulcis, 3j. ; Cetaceum, 3j. ; Ol. Bergam. 3ss. Melt the spermaceti, and add the oils gradually. Let it stand till cool, and you will find it crystallized.

Also in your journal of the 18th of November there is another query, which you appeal to the subscribers of your journal to answer, which I shall be very happy to do if not taking up too much space.

The preparation in the Pharmacopœia called Lin. Camph. is made by dissolving 3j. of Camph. in 3iv. of olive oil. If this preparation—that is, Lin. Camph. 3j.—is mixed with melted spermaceti 3j. when it cools you will have the camphor ball, or camphor cake, which ever you please to call it.

This answer is intended for the correspondent who signs himself *Oreopes*.

Guy's Hospital, Nov. 26, 1842.

Your obedient servant,—GUYENSIS.

## APATITE AS A FERTILIZER.

*To the Editors of the Annals of Chymistry and Pharmacy.*

GENTLEMEN,—Could you or any of your readers inform me whether Apatite or native phosphate of lime has been used successfully as a fertilizer. I believe it to have been imported from Spain for the purpose, but have not been able to ascertain the effects produced.—I remain, gentlemen, your obedient servant,

November 28, 1842.

AGRICOLA.

SPIRITUS AMMONIÆ, P. L. 1815.—Ammon. Mur. (coloured), 4 lbs. 6 oz. ; Potass. Subcarb. (cineres clavell.) 8 lbs. ; S. V. R. cong. 3. Draw off 3 gallons, or rather 22 lb. A.

[Remember to prevent the small tube being filled up, as an accident happened from this cause <sup>4</sup>/<sub>5</sub>, 1823.]

N. B.—The Spiritus Ammoniz Simplex is directed by the College (1815), to contain rather more than three times as much ammonia as the Spiritus Ammoniz Aromaticus.

SPIRITUS AMMONIÆ AROMATICUS, P. L. 1815.—After drawing off former batch, all—Cort. Cinnam. Parv. 3jss. ; Nucis Moschatæ, 3vij. ; Ess. Limonum, 3j. ; Ammon. Mur. (coloured), 3 lbs. 7 oz. ; Cineres Clavellat, 6 lbs. 4 oz. ; S. V. R. cong. 5, o. m. Draw off 7½ gallons. The weight should be 58 lb. 2 oz.

SPIRITUS AMMONIÆ COMPOSITUS, P. L. 1787.—After drawing off former batch, all—Ammon. Muriat. (coloured), 7 lb. 4 oz. ; Cineres Clavell. 14 lb. ; Ess. Limonum, 3v. ; Nucis Moschatæ, 3jss. ; S. V. R. cong. (o. m.) 5. Draw off 37 lbs. which suppose is 5½ gallons, o. m.

SPIRITUS AMMONIÆ FETIDUS.—Ammoniz Muriat. (coloured), 2 lb. 3 oz. ; Potassæ Subcarb. (cineres), 4 lbs. ; Asafetidæ, 1 lb. 10 oz. Spirit from extracts, q. s. according to specific gravity. Draw off 12 pints of the strength of rectified spirits.

SPIRITUS AMMONIÆ SUCCINATUS.—Liquor Ammoniz, 3v. ; Tinct. Mastich. 3v. ; Ol. Succini (own), gtt. jv. ; Ol. Lavand. Aug. gtt. xvj. —first unite the tincture and oils. Misce, S. A.

The above processes, as formerly practised in the laboratory of Messrs. Allen, Hanburys, and Barry, of Plough Court, possess an interest for the young pharmacien, as indicating the extreme maintenance with which the above eminent firm caused every detail to be inserted in their journal.

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\* \* Communications, Books for Review, &c. are requested to be addressed —“To the Editors of the ANNALS OF CHYMISTRY, care of Messrs. Longman, Brown, and Co. Paternoster Row.”

WILSON AND OGILVY, 57, SKINNER STREET, SNOWHILL, LONDON.

THE  
ANNALS OF CHYMISTRY  
AND  
PRACTICAL PHARMACY.

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No. 11.] FRIDAY, DECEMBER 9, 1842. [VOL. I.

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ELEMENTARY COURSE OF PHARMACY;  
CHIEFLY FROM THE GERMAN OF  
P. A. CAP AND RUDOLPH BRANDES,  
COLLATED WITH THE WORKS OF  
PHŒBUS, SOUBEIRAN, GUIBOURT, LECANU, DUFLOS, GMELIN, &c.  
[Continued from page 300.]

§ 6. *Medical Schools of the Benedictines.*—In many parts of Europe, more especially in Italy, monks were engaged in the task of healing the sick, and, consequently, endeavoured to obtain a more extended knowledge of the medical art than a mere acquaintance with medicines. This was the case more especially with the Benedictine Convents at Monte Casino and Salerno, in Italy, where distinguished teachers of medical science were educated, and, indeed, medical schools of some repute established. That of Salerno, even in the eighth century, was held in the highest estimation. King Roger, of Naples, even so early as the twelfth century, conferred a medical charter in his domains; and this was considerably extended by the Emperor Frederick II. forming a very laudable code, as regards the druggist and the physician. The *stations*, for such the apothecaries' or druggists' shops were termed, were only permitted to be established and held by *confectionarii*—persons who were compelled to submit to an examination, and who had bound themselves, by oath, to the due performance of their duties. The price of remedies was guided by certain regulations, the number of drug-establishments limited, and physicians were prohibited from being the proprietors of a shop, or open dispensary.

This early example of medical regulations, commenced in the eighth century at Naples, was imitated by other European states; so that, in the course of the twelfth, thirteenth, fourteenth, and fifteenth centuries, druggists', or, as they are termed on the continent, apothecaries', shops, were gradually established in France, Germany, Switzerland, Denmark, &c. and subjected to legislative enactment; whilst it has remained for the druggists of Great Britain, in the nineteenth century, at the sound of the tocsin of self-preservation, to seek the protection of laws and a constitution. But we leave our readers to pursue the parallél.

On the foundation of universities in Germany, medical science and pharmacy, which, until that time, had been only empirically treated, began to assume a somewhat scientific aspect. The natural sciences, especially chymistry and botany, necessarily exerted considerable influence on the stock of remedies. A medical literature sprung up: the works of Geber, the Arabic sage, Roger Bacon, Albert of Bollstaedt, Raymond Lully, Basil Valentine, and others, although partly written under the influence of illusory alchymical research, contributed to this end; and such literature was much enriched by the labours of the writers of the sixteenth and seventeenth centuries—as Hieronymus Bock, surnamed Tragus, Conrad Gessner, Rambert Dodonaus, Matthias von Lobel, Casalpinus Joachim Camerarius, Jacob Theodore Tabernamontanus, Otto Brunfels, Jacob Sylvius, Andreas Libavius, Oswald Croll, Joseph du Chonn, surnamed Quercetanus, Saladin of Asculo, and others.

§ 7. *Recognition of Pharmacy by Governments.*—The advanced position to which pharmacy had meanwhile attained, induced the governments of most states to regulate the profession by favourable laws; and during the sixteenth and seventeenth centuries there were published in all countries Dispensatories, Pharmacopœias, and Regulations for those practising the medical art, all of which necessarily bear the stamp of their time. The Dispensatories especially were filled with prescriptions, enumerating many remedies which a more enlightened knowledge of natural bodies caused to be rejected, since their application was based partly on superstition, and partly on absurd views of chymistry. In the seventeenth century, however, when the sciences generally made such rapid progress, and distinguished men exerted so great an influence in all branches thereof, pharmacy necessarily progressed likewise; it being, in fact, simply the practical application of such sciences. The works of Majou-Sylvius, Mynsicht, Kircher, Glauber, Kunkel, Becher, Isaac Holland, Chr. Glazier, Agricola, Bauhin, Tournefort, Zwölffer, Robert Boyle, Beguin, Nicolas Lemmery, and Stahl, greatly enriched pharmacy, and caused it to assume a more and more scientific form. This was the case especially in the eighteenth century, when Linnæus

established his system of plants ; Gleditsch, Jussieu, Swartz, Schreber, and others, exerted themselves for the progress of botany ; Buffon, Blumenbach, and others, for zoology ; Wallerius, Cronstedt, Kirwan, Werner, and others, for mineralogy ; Stahl, Marggraf, Rouelle, Geoffroy, Caspar Neumann, Bergman, Scheele, Black, Lavoisier, Vauquelin, Berthollet, Fourcroy, Gren, Hagen, Götting, Westrumb, Wiegand, Hermbstädt, Klaproth, Richter, Bucholz, Trommsdorff, and others, for chymistry, and especially also for pharmacy.

The great number of discoveries and valuable additions produced by the labours of the previously named and many other men of these times, caused the publication of scientific journals for Chymistry, Natural Philosophy, and Natural History ; and it is a praiseworthy sign of the attempts of pharmacutists of that early period, that separate periodicals were even then established for Pharmacy, since these must exert considerable influence on the scientific practice of the art ; and its domain was rapidly extended to such a degree that, at the end of the eighteenth century, separate pharmaceutical institutions or schools were established, in which instructions were given both on pharmacy as also on those auxiliary natural sciences connected with it. Besides this, societies were formed for the special purpose of promoting pharmacy.

§ 8. Thus did pharmacy gradually improve until it became an independent scientific art ; and the beautiful results which accompanied the close of the eighteenth century were gratefully received by the nineteenth, and carried on in every particular branch to still greater perfection. An immense field has been opened by researches and experiments ; and knowledge has been gathered from all quarters, throwing new light on the various branches of natural science until then unveiled, and thus instigating new and profound researches over the practice of pharmacy. We have only to mention, in reference to the present time, the labours of some few who have already “ shuffled off this mortal coil ” — as Bucholz, Trommsdorff, V. Rose, Schrader, Giese, Scherer, Dörffurt, Gehlen, Davy, Stromeyer, Proust, Kirchhof, Henry, Robiquet, Geiger, Hämle, Planche, Cadet, Fr. Nees v. Esenbeck, Willdenow, Hayne, Wollaston, Serullas, De Candolle, Pelletier, Du Menil, Hennell, and others.

§ 9. Pharmacy has been considerably changed by the numerous discoveries and progress of natural sciences. A number of useless remedies and worthless compounds have been removed from the Dispensatories and Pharmacopœias, after critical examination, for which desirable result we are deeply indebted to chymistry. By the discovery of fixed proportions in combinations, the formulæ for chymical remedies have been scientifically defined, and a considerable improvement in remedies has been

especially produced by the progress of organic chymistry, inasmuch as this latter has given particular instructions for obtaining those elements of active principles on which their action is founded. All these facts united have procured for pharmacy a high standing in the medical science of different countries. Its importance to this latter has been acknowledged to its full extent where it has most progressed. The surveillance of the executive, and regulation of druggists' shops, as there practised, under well-defined regulations, and the introduction of pharmacists to the first honorary distinctions, in order to promote the practice of their art, are instances of this. In the present position of pharmacy, it will be sufficient simply to continue this course, and to follow it up, in order to obtain the most gratifying results for an occupation which has the high duty to perform, of aiding in the diminution of human suffering.

The scientific instruction of the druggist has attracted the deserved attention of many universities; special chairs or professorships of pharmacy, and celebrated pharmaceutical institutions, have been combined with them. Finally, pharmaceutical societies have, even in limping England and Ireland, been formed for the purpose of promoting the progress of this art. These societies extend more and more; and the best results of united efforts everywhere become apparent wherever they extend. These societies have contributed, in a great measure, to the promotion of pharmacy, especially in Germany, and likewise in France. The Pharmaceutical Society of Paris; in Russia, the Pharmaceutical Society of Petersburg; in Portugal, the Pharmaceutical Society of Lisbon; are prominent for the valuable contents of their journals.

This short historical sketch of pharmacy, which may be found detailed in the works of Buchner, Geiger, Schmidt, Reichard, and others, proves clearly that the preparation of remedies should be an independent art, separate from the practice of medicine, in the limited sense of the term, in order to ensure the benefits of improvement, notwithstanding both may remain united in pursuing their several aims. Since almost all branches of natural science now enter into more or less close connection with pharmacy, the latter offers to its followers a large field of discoveries and wealth, by investigating the vast domains of natural science; and thus, following up its natural task of improving remedies, it simultaneously aids in improvement of such science. The position of pharmacy is, therefore, in the present day, a very honourable one. Fulfilling its important vocation, it at the same time becomes a school for the cultivation of information of the most useful, varied, and interesting kind.

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## CHYMISTRY, OPERATIVE AND EXPERIMENTAL.

ART. II.—*On the Analysis of Oxgall, and the Characteristic Properties of its Elements.* By the Baron J. BERZELIUS.

[From the Kongl. Vet. Acad. Handl.]

[Continued from page 306.]

THOSE portions which dissolve in alcohol are a mixture of fellinic and cholinic acids, which, if the change of the bilin has not been previously complete, may contain a small portion of the acids obtained from them and from bilin. These latter, however, may be removed by water of barytes, after which fellinate of barytes is dissolved by dilute alcohol, leaving behind choline of barytes.

Muriatic acid produces entirely similar effects. Its application is especially convenient for obtaining taurin, cholinic acid, fellinic acid, and even dyslysin. I, however, have preferred, in the preceding experiments, the use of sulphuric acid, because it is easier to obtain a residue of unchanged bilin in the acid liquor by employing this latter.

The rationale of these processes is to be found in Demarcay's discovery of the changes produced in gall by acids. He, however, overlooked the fact, that these changes only affect the bilin. Of this he was not aware, viz. that the acids formed during this process are produced at the expense of this principle; that there are two, and not simply one, produced; and that continued treatment with acid converts them into dyslysin.

If gall, after having been taken from the gall-bladder, and allowed to stand for a few days in the summer, is treated with sulphuric acid in the manner just now explained, a plentiful plaster-like precipitate is at once obtained, which proves how quickly the spontaneous change of gall takes place.

*Analysis of Gall with Acetate of Lead.*—A spirituous solution is prepared with anhydrous alcohol from inspissated gall. This is dissolved in water, and the solution precipitated with a solution of acetate of lead until the liquor ceases to become turbid by its addition. The precipitate thus produced is of a greenish-brown colour, is not coherent, and becomes darker whilst drying, forming coarse grains.

*The precipitate produced by neutral Acetate of Lead* is infused with alcohol, which extracts therefrom a small quantity of biliary fellinate of lead, leaving, however, the greater part undissolved. It is then, together with a fresh portion of alcohol, of 0.86 sp. gr., treated with sulphuretted hydrogen, which decomposes the salt of lead, the acids of which dissolve in the alcohol, and remain after the alcohol has been removed by distillation. Ether, applied in

small quantities, extracts biliverdin and fatty acids. A fresh portion of ether extracts the rest of the biliverdin, leaving behind a brown magma of cholinic acid, coloured by the acid of the bili-fulvin, which can scarcely be sufficiently disengaged therefrom, so that the cholinic acid afterwards obtained shall be colourless. Boiling alcohol of 0.833 extracts from the sulphuret of lead some choleic acid.

The liquor being first precipitated with acetate of lead, is then precipitated with a somewhat dilute solution of basic acetate of lead, by adding the latter in small portions, and continually stirring, until a precipitate ceases to appear, which will be found strongly coloured, and coheres very rapidly. Shortly after the precipitate begins to whiten and cohere, it is separated by filtration. We shall term this the first precipitate with acetate of lead.

The filtered liquor is then completely precipitated with neutral acetate of lead, and filtered. We shall call this the second precipitate obtained with neutral acetate of lead.

The precipitated and filtered liquor is freed from the oxide of lead by sulphuretted hydrogen, filtered and evaporated in the water-bath to dryness. The sulphuretted lead separates with difficulty; wherefore the liquor, previous to filtration, has to undergo partial evaporation. This operation again imparts to it some traces of lead. The remaining lead may, however, after concentration and mixing with alcohol, be easily precipitated by sulphuretted hydrogen, and disengaged, after which the liquid parts are removed by evaporation, and the dry residue treated with anhydrous alcohol. This dissolves bilin, and likewise acetate of soda and potassa, formed from all the salts contained in gall, the acids of which have been disengaged in the form of basic salts of lead. The bilin remaining behind after the evaporation of the alcohol is colourless and transparent; but it easily absorbs moisture from the atmosphere, becoming white, and showing some traces of a crystalline texture. This is the gall sugar of Gmelin.

The alkali may be removed therefrom by sulphuric acid, which is allowed to fall in drops into a solution thereof in anhydrous alcohol. If it could be possible not to add more sulphuric acid than exactly requisite, the solution would then require only to be evaporated to dryness, during which operation the acetic acid escapes. The sulphuric acid is, however, precipitated from the solution after the filtration, by a little acetate of lead, the excess of which is removed by sulphuretted hydrogen; after which the filtered solution is evaporated to dryness in the water-bath.

*The first precipitate with acetate of lead* is, properly speaking, nothing but an admixture of the second with that formed by neutral acetate of lead; for as soon as the latter precipitates the

gall, acetic acid becomes free in the liquor, and finally prevents further precipitation by the neutral salt. The precipitate is washed and treated with alcohol, which dissolves bilifellinate of lead, leaving behind the bilicholinate of lead, which then, according to the above explained method, is treated with alcohol and sulphuretted hydrogen.

*The second precipitate with acetate of lead* is dissolved in alcohol, decomposed therein with sulphuretted hydrogen, and the treatment continued according to the method above explained in reference to the decomposition of the plaster-like combination of lead. It seldom yields any trace of taurin in the event of the gall used having been perfectly fresh.

[To be continued.]

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ART. III.—*On the Preparation of Iodide of Potassium ; being a Digest of the Treatise on the above Preparation, which gained the Prize of the Hagen Bucholzian Foundation.* By OTTO EDER.

[Concluded from page 274.]

It is necessary to dissolve more iodine in the ley of caustic potash than the latter is able to combine with, in order to be certain that the caustic potassa is perfectly saturated. If the ley of caustic potassa employed contains carbonate, it is the more necessary to add iodine in excess, since otherwise the salt obtained is frequently alkaline, and contains carbonate of potassa and sulphur. Previous to introducing the stream of sulphuretted hydrogen into the ley, it is necessary to dilute the latter considerably, for if the ley be concentrated, the disengaged sulphur conglomerates, carrying with it a portion of the free iodine present, and thus withdrawing it from the further action of the sulphuretted hydrogen. We may be satisfied as to the complete decomposition of the iodate of potassa by sulphuretted hydrogen, if the ley, after having been left for 24 hours in a covered vessel, still evolves a perceptible odour of hydrothionic acid. All the sulphuretted hydrogen gas present in excess being then removed by exposing the ley to a certain degree of heat, it only remains to ascertain if the liquor does not indicate an acid reaction by free hydriodic acid, which may easily occur if the iodine has been employed in considerable excess. It is then necessary to carefully neutralize by carbonate of potassa, because otherwise the iodide of potassium obtained would assume a yellow colour in time, by the decomposition of the adhering hydriodic acid.

7. *Preparation by means of caustic lime and iodine.*—M. Herrmann has published the following preparation of iodide of



potassium, in the *Pharmaceutisches Central-Blatt*. (1835) p. 191. He adds iodine to milk of lime until a yellowish colour appears, then dilutes with water, filters, precipitates with carbonate of potassa, and evaporates to crystallization, when, as he states, beautiful crystals of iodide of potassium are obtained. Mr. H. here entirely overlooked the formation of iodate of lime, and the iodide of potassium must unavoidably have been much contaminated with iodate of potassa. Not thinking, however, the application of caustic lime, in lieu of caustic potassa, altogether exceptionable for the preparation of the iodide, we also undertook some experiments with this former.

To milk of lime, prepared from half an ounce of caustic lime, 6 drachms 20 grs. of iodine were added by degrees: the pappy mass having assumed a yellow colour, was diluted with water, filtered, and the residue washed with water (for which hot water is best employed, since the iodate of lime is not readily soluble) until the decanted liquor no longer indicated the presence of iodine. This ley of iodide of calcium and iodate of lime cannot be converted into iodide of calcium by evaporating to dryness, and heating the residue to redness, since the saline mixture, when evaporated over the water-bath, assumes, as it gradually becomes dry, a brown colour, evolving at the same time fumes of iodine. The ley was therefore at once decomposed by carbonate of potassa, the disengaged carbonate of lime separated by filtering, and washed. A considerable quantity of water is here likewise required for the purpose of entirely removing the iodate of potassa, which dissolves with difficulty from the precipitated lime, and thus a great quantity of a dilute solution is obtained. The ley of iodide of potassium and iodate of potassa thus obtained cannot be judiciously treated by evaporation to dryness, and heating the residue to redness, for the reasons previously stated. Sulphuretted hydrogen gas was therefore introduced, until a sample, after being filtered, no longer assumed a yellow colour by the action of dilute acids: when evaporated, and set aside for crystallization, it yielded, indeed, a beautiful iodide of potassium.

In the next experiment the solution of iodide of calcium and iodate of lime was not decomposed with carbonate of potassa, as above, but the iodate of lime, previously converted into iodide of calcium, by introducing sulphuretted hydrogen gas. After being filtered the liquor was then exposed to heat, for the purpose of expelling the sulphuretted hydrogen present in excess, and then carefully precipitated with carbonate of potassa. It is judicious to execute the decomposition at a high temperature, and to wash the precipitate of carbonate of lime with warm or recently boiled water. The carbonate of lime is then easily obtained

entirely free from iodine, and the iodide of potassium does not contain any trace of lime. The only inconvenience met with is the same as during the preparation from ioduret of iron and of zinc; that is, it appears almost impossible to avoid an excess of carbonate of potassa. The greater part of the salt is, however, obtained in a neutral state by crystallization.

This process might, therefore, deserve a preference over the former, because we avoid the necessity of twice removing (by washing) a salt in the state of iodate of lime and of potassa, which is difficult of solution. In order to define the product with more precision, a greater quantity of iodine was now taken for another experiment. One ounce and a half of caustic lime was hydrated with water to a pappy mass; this was diluted with 12 ounces of water, and then, during the application of a gentle heat, 2 ounces and 3 drachms of iodine were added. The liquor having assumed a yellow colour from the iodine, was then diluted a second time with 12 ounces of water, filtered, and the residue washed with 28 ounces of hot water. When the liquor was almost cool, but before the iodate of lime began to be disengaged by crystallization, hydrothionic acid was introduced until the iodate of lime was completely decomposed. The ley of iodide of calcium thus obtained was freed from the disengaged sulphur by filtration, and from the excess of sulphuretted hydrogen by heating, then decomposed by carbonate of potassa, of which it required 1 ounce,  $3\frac{1}{2}$  drachms, and 2 grs. The precipitate of carbonate of lime produced was collected on a filter, and washed with 20 ounces of water. The ley of iodide of potassium evaporated, and set aside for crystallization, yielded 3 ounces, 2 drachms, and 10 grains of crystals. The crystals obtained at the end, however, gave indications, as did the mother liquor, of a feebly alkaline reaction; the contents of iodide of potassium were ascertained as at experiment No. 1. By calculating the whole of the material employed, in this case, with the exception of the sulphuret of iron and the sulphuric acid employed for evolving the required sulphuretted hydrogen, the expenses of both being amply covered by the sulphate of protoxide of iron obtained, the quantity of iodide of potassium thus obtained costs about 1s. 3d., which, for a lb., would give 6s. 3d.

Although it would not appear unprofitable, according to these results, to follow this mode of preparing iodide of potassium, there are several inconveniences connected with it:—1st. The residue left by the lime is to be washed; its quantity is not always the same, but in proportion to the greater or lesser purity of the caustic lime employed, and in preparing large quantities of iodide of potassium, it is certainly difficult to wash it thoroughly. The precipitate of carbonate of lime has likewise to be washed, which, indeed, succeeds more easily, since, in this

case, the salt is one which dissolves with facility; at the end of the operation, however, a very voluminous ley remains for evaporation, causing, it is true, by the application of steam apparatus, now so frequently used, but little trouble and expense, as regards fuel. The addition of a small excess of carbonate of potassa cannot be avoided; this is, however, very slight, if the work is carefully executed; and is, perhaps, a minor objection to this method.—*Ph. C.-Blatt*. Nos. 17 & 18.

[The preceding elaborate paper is by the pupil of a pharmacien competing for the Hagen Bucholzian foundation. It is interesting to the apprentice, as shewing the proficiency of his continental fellow labourer, on the termination of apprenticeship.—ED.]

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ART. IV.—*On the Adulteration of the Oils of Commerce.* By  
M. HEIDENREICH.

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[Continued from page 215.]

M. PENOT, in a report on the preceding researches of M. Heidenreich, made in the name of the chymical *Comité de la Société Industrielle de Mühlhausen*, makes the following additional remarks to the three means suggested by M. H. for discovering the adulteration of oils.

1. As regards the detection of adulteration by the odour of an oil, it must be observed, that the same oil—that is to say, an oil of the same fruit or nut—has not always the same odour. This is especially the case with olive oil; the odour of which differs according to the different places where it has been grown. The same is the case with other oils, if cold drawn, expressed under the influence of heat.

2. *By the Action of Sulphuric Acid.*—M. Penot directs us to employ 20 drops of oil, which he placed on capsules of white porcelain. He likewise found that every different kind of oil indicated a different reaction, which, however, did not entirely agree with the results obtained by M. H. Besides this, M. P. employed a saturated solution of chromate of potassa in sulphuric acid, always in the proportion of 1 drop to 20 drops of oil, which were stirred together. The following table shows the difference of the reactions on twenty different kinds of oil produced by both reagents. It is, however, necessary, in order to ensure greater certainty, that we should first compare the effects of them on a pure oil, when any oil is suspected to have been adulterated, since it is difficult to remember precisely the colours produced by reagents, and still more difficult to convey such a definition as will be understood by every one.

## ACTION OF ONE DROP OF THE RE-AGENT ON TWENTY DROPS OF OIL.

| NAME OF THE OIL.                                                                               | SULPHURIC ACID.                                                            |                                    | SOLUTION OF<br>BICHROMATE OF POTASSA                         |
|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------|--------------------------------------------------------------|
|                                                                                                | Not stirred.                                                               | Stirred.                           |                                                              |
| Oleic acid . .                                                                                 | Reddish spots with reddish circles.                                        | Reddish-brown .                    | Reddish-brown.                                               |
| Oil of sweet almonds.                                                                          | Greenfinch-yellow with orange spots                                        | Dirty-green .                      | Yellowish small lumps.                                       |
| Whale train oil .                                                                              | Reddish small lumps on brown ground                                        | Lees of wine .                     | Brownish-red small lump on a brown ground                    |
| Hemp oil . .                                                                                   | Brown small lumps on a yellow ground                                       | Greenish-brown .                   | Yellow small lumps on a green ground.                        |
| Rapeseed oil .                                                                                 | Scarcely perceptible spots.                                                | Green . .                          | Yellow small lumps on a ground coloured green by the chrome. |
| Liver train oil .                                                                              | Dark-red . .                                                               | Dark-red . .                       | Dark-red.                                                    |
| Linseed oil from the Upper Rhine                                                               | Dark reddish-brown                                                         | Brown small lumps on a gray ground | Brown small lumps on an almost colourless ground.            |
| Linseed oil from Paris.                                                                        | Reddish-brown, less dark-coloured.                                         | Clotted brown on a green ground.   | Brown small lumps on a ground coloured green by the chrome.  |
| Madia sativa .                                                                                 | Slightly reddish-brown underneath a thin layer (film), approaching to gray | Olive-green .                      | Light-brown small lumps on an olive-coloured ground.         |
| Rapeseed oil, one year old, pressed out after exposing the seeds to a gentle heat.             | Green . .                                                                  | Blueish-green .                    | Yellow small lumps on a chrome-green ground.                 |
| Rapeseed oil, one year old, pressed out at a somewhat higher temperature from another factory. | Green . .                                                                  | Blueish-green .                    | Yellow small lumps, more numerous, on a dirty-green ground   |
| Rapeseed oil, fresh                                                                            | Green . .                                                                  | Blueish-green .                    | Yellow small lumps on a ground coloured green by the chrome. |
| Nut oil . .                                                                                    | Yellowish-brown                                                            | Clotted, dark-brown                | Small brown lumps.                                           |
| Nut oil, one year old.                                                                         | Yellow . .                                                                 | Dirty-brown, less dark-coloured.   | Small brown lumps.                                           |
| Nut oil, one year old, from another factory.                                                   | Orange-yellow .                                                            | Dirty-brown .                      | Small brown lumps.                                           |
| Olive oil, from Beaucaire.                                                                     | Slightly yellow .                                                          | Dirty-brown .                      | Olive-brown.                                                 |
| Olive oil . .                                                                                  | Orange-yellow .                                                            | Brownish-gray .                    | Brown.                                                       |
| Olive oil, expressed by engine from fermented olives.                                          | Orange-yellow .                                                            | Brownish-gray .                    | Brown.                                                       |
| Poppy oil, fresh, cold-drawn.                                                                  | Yellow spots .                                                             | Brownish olive-coloured.           | Small yellow lumps on a white ground.                        |
| Poppy oil, one year old, expressed at a slight heat.                                           | Greenish spots .                                                           | Slightly green .                   | Small yellow lumps on a green ground.                        |
| Neatsfoot oil .                                                                                | Yellow slight spots                                                        | Dirty-brown .                      | Brown spots on a brown ground.                               |
| Castor oil, native                                                                             | Yellow slight spots                                                        | Almost colourless                  | Slightly green.                                              |

By perusing this table, M. P. continues, it will be observed that the same oil does not, under all circumstances, yield precisely similar results with the same re-agent. This depends on the place of their growth, their age, and the manner of pressing. If, however, any oil be examined comparatively with a perfectly pure one, if not a conviction, at least the probability of adulteration may be gained. Thus I obtained, by adding 1 part of either whaletrain or linseed oil, or oleic oil, to 10 parts of rapeseed oil, the following results :—

| NAME OF THE OILS.              | SULPHURIC ACID.                                  |                          | SOLUTION OF BICHROMATE OF POTASSA.                             |
|--------------------------------|--------------------------------------------------|--------------------------|----------------------------------------------------------------|
|                                | Not stirred.                                     | Stirred.                 |                                                                |
| Rapeseed oil with whale train. | More red ground than with rape seed oil.         | Brownish-olive coloured. | Small reddish lumps on a grey ground.                          |
| Rapeseed oil with linseed oil. | No perceptible difference from the rapeseed oil. | Olive coloured.          | Small and more numerous red lumps on a very dark-green ground. |
| Rapeseed oil with oleic oil.   | No perceptible difference from the rapeseed oil. | Greenish brown.          | Small brownish lumps on an olive-coloured ground.              |

The adulteration being ascertained so far as is possible, the oil is then tested by endeavouring to discover the adulterating oil either by re-agents, or by its odour when gently heated, as before described. This having been found out, small quantities of the suspected are added to a perfectly pure oil of the kind under examination. Every mixture is then tested by the re-agents, until precisely similar results are obtained as those yielded by the oil under examination. Thus the proportions of the two mixed oils will be discovered by approximation.

3. *By their density.*—M. P. thinks that oils of the same name, equally pure, but not identical, never have the same density : he found in almost all cases the statements of M. H. in this respect correct\*.

[To be continued.]

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\* The editor of the *Journal f. Prakt. Chemie*, from which we have taken the preceding article, remarks, in a postscript, that he has not found, in the course of his own experience, any difference in the specific gravity in oils of the same kind obtained from different places and grown in different years; and that in Saxony an areometer (or oleometer) is generally used for testing oils, constructed by the instrument-maker Fischer, of Leipzig, which indicates the specific gravity of oils in such manner that pure rapeseed oil is indicated by 37 to 38°; hemp oil by 30 to 31°, &c. This oil-balance is very correct and useful. Another assistance in such examinations is the capillarimeter, an instrument for indicating the quantity of each oil which falls from a certain sized point under given circumstances.

ART. V.—*Preparation of Gelatinous Capsules.*

ACCORDING to Simonin, oval balls of wax, of the requisite size, must be prepared by pouring wax into a wooden mould, consisting of two parts, and arranged for the reception of a row of these balls. These are afterwards stuck on iron needles, affixed to rods of convenient size, in rows. The balls must then be uniformly coated all at once by dipping in the usual manner, then removed from the needles, and placed, with the needle-holes downwards, on a heated plate, when the wax flows out, and a round capsule is left behind.—*Journ. d. Chimie Medic.*

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## CHYMISTRY APPLIED TO AGRICULTURE.

ART. VI.—*On the Inorganic Constituents of Plants.* By  
DRS. A. F. WIEGMANN and L. POLSTORFF.

OUR correspondent at Hamburg gives us a short extract of an interesting work, published in the course of the last month at Brunswick, under the title of, "On the Inorganic Components of Plants; being an answer to the question, Are the inorganic elements, found in the ashes of plants, such essential components of the vegetable organism that they are required for the complete evolution of the plant, and are they introduced into the plants *ab externo*?"—a publication which received the prize at Göttingen, in the year 1842, written by Professor A. F. Wiegmann, of Brunswick, and Dr. L. Polstorff, pharmacist, of the same place.

An anonymous friend to botany proposed a considerable prize for the satisfactory answer of the above question, and named Professors Bartling, Berthold, and Wöhler, of Göttingen, as umpires. The treatise of the above-mentioned authors was acknowledged as deserving the prize.

By burning plants, ashes remain, containing the inorganic components of the former. It was now to be ascertained by experiment whether plants are able, by their *vegetative power*, to create the elementary substances in the ashes, or if the latter be taken up partly from the soil, partly from the atmosphere, snow, and rain, and, therefore, *ab externo*.

For this purpose quartzose sand was exposed to a red heat, in order to destroy all organic parts therein contained, then twice digested for sixteen hours with dilute nitro-muriatic acid, and finally washed with boiling distilled water.

Besides this, an artificial mixture was prepared, according to Sprengel's analysis of a fertile soil, composed, as follows:—

|                                          |        |
|------------------------------------------|--------|
| 1. Pure quartzose sand . . . . .         | 861.20 |
| 2. Sulphate of potassa . . . . .         | 0.84   |
| 3. Dry common salt . . . . .             | 0.13   |
| 4. Baked gypsum . . . . .                | 1.25   |
| 5. Chalk . . . . .                       | 10.00  |
| 6. Carbonate of magnesia . . . . .       | 5.00   |
| 7. Oxide of manganese . . . . .          | 2.50   |
| 8. Oxide of iron . . . . .               | 10.00  |
| 9. Alumina . . . . .                     | 15.00  |
| 10. Phosphate of lime . . . . .          | 15.60  |
| 11. Humate of potassa . . . . .          | 3.47   |
| 12. Humate of soda . . . . .             | 2.22   |
| 13. Humate of ammonia . . . . .          | 10.29  |
| 14. Humate of lime . . . . .             | 3.07   |
| 15. Humate of magnesia . . . . .         | 1.97   |
| 16. Humate of peroxide of iron . . . . . | 3.32   |
| 17. Humate of alumina . . . . .          | 4.64   |
| 18. Insoluble humus . . . . .            | 50.00  |

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1000.00

Six pots were then filled with pure quartzose sand, and six others with the artificial soil, both perfectly protected by glass-cases from the dust of atmospheric air, having first introduced into one of each lot 3 grammes (= 46 grs.) of vetch-seed for the first pair; buckwheat for the second, and so on; oats, barley, clover (*trifolium pratense*), and tobacco-seed. The contents of the pots were kept moist by distilled water. The whole of the seeds shot forth equally well, thriving at first. After, however, some weeks, a change to the disadvantage of those plants growing in the quartzose sand might be perceived. Thus, the vetch (*vicia sativa*) attained in the sand, after three months, a height of ten inches, unfolded its blossoms, and began to form small husks, not containing, however, any seeds; whilst those in the artificial soil grew to the height of  $1\frac{1}{2}$  feet, and produced husks with ripe seeds of fertile germs. The five other plants gave similar results; most of them showed blossoms in the sand without producing fruits, whilst those in the artificial soil grew as well as in a natural soil. The whole of the plants were collected, dried, and separately burnt; the ashes were weighed, and the quantity of the different components ascertained. The weight of the ashes of the seeds employed (being likewise ascertained by quantitative analysis) was then deducted from the amount, in order to ascertain the quantity absorbed by the plants grown both in the sand and in the artificial soil. The analysis of the ashes of *Nicotiana Tabacum* may serve as an instance.

1. It was not required to perform the analysis of the ashes in-

produced with the seed, as it may be considered as 0. [In the case of the other seeds this analysis is added.]

2. *The plants grown in the sand.*

Five plants, dried at from 25 to 30° Cels., = 77° to 90° F., had a weight of 4 grammes, = 61.7 grs., yielding when burnt 0.506 of ashes, = to 12.6 per cent. : this contained,

|                                        |       |                                                  |
|----------------------------------------|-------|--------------------------------------------------|
| a. Substances soluble in water         | 0.223 | { Potassa,<br>Carbonic acid,<br>Siliceous earth. |
| b. Substances soluble in muriatic acid | 0.252 | { Lime,<br>Magnesia,<br>Carbonic acid.           |
| c. Residue . . . . .                   | 0.031 | Siliceous earth.                                 |

Total, 0.506 of a gramme,  
= 7.5 grs.

3. *The plants grown in the artificial soil.*

Three plants, dried at from 25 to 30° Cels., = 77° to 90° F., weighed 21.5 grammes = 824.1 grs., yielding when burnt 3.923 = 18.2 per cent. of ashes : containing,

|                                                  |       |                                                                                                                        |
|--------------------------------------------------|-------|------------------------------------------------------------------------------------------------------------------------|
| a. Substances soluble in water . . . . .         | 1.146 | { Potassa and some lime.<br>Carbonic acid.<br>Sulphuric acid.<br>Chlorine.                                             |
| b. Substances soluble in muriatic acid . . . . . | 2.228 | { Lime.<br>Magnesia.<br>Carbonic acid.<br>Phosphoric acid.<br>Oxide of iron<br>Alumina<br>Oxide of manganese } traces. |
| c. Residue . . . . .                             | 0.549 | Siliceous earth.                                                                                                       |

Total . . 3.923 = nearly 60 grains.

|                                          | In the sand. | In the artificial soil. |
|------------------------------------------|--------------|-------------------------|
| The proportion of organic substances was | 10           | 53                      |
| " " inorganic " "                        | 50           |                         |

It appears, from the analysis of the plants grown in the sand, that they had assimilated carbonic acid, potassa, lime, magnesia, and siliceous earth. From whence? The quartzose sand was not, indeed, chymically pure from siliceous earth; it is true that it was digested with nitro-muriatic acid: this, however, left several silicates; as, for instance, field-spar is not decomposed. The sand was then closely examined; it contained, after being digested with acids,



|                         |        |
|-------------------------|--------|
| Siliceous earth . . . . | 97·900 |
| Potassa . . . . .       | 0·320  |
| Alumina . . . . .       | 0·876  |
| Oxide of iron . . . .   | 0·315  |
| Lime . . . . .          | 0·484  |
| Magnesia . . . . .      | 0·009  |

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99·904

How was it possible that plants decomposed substances which nitro-muriatic acid could not decompose? The writers presumed that carbonic acid had, in such cases, considerable influence; they therefore endeavoured to ascertain,—

1stly, Whether the roots of living plants disengage carbonic acid; and,

2dly, Whether carbonic acid is a condition of the decomposition of silicates.

The first question was at once decided in the affirmative, when living plants, with uninjured, well-washed roots, were placed in an aqueous solution of litmus, and allowed to vegetate therein. The blue colour of the litmus water soon changed into red, and the reddened liquor reassumed its original tint when exposed to heat, whilst small bubbles of carbonic acid escaped.

For the purpose of deciding the second question, 3 kilogrammes (= about 7 lbs.) of the sand, treated with nitro-muriatic acid, were placed in a large cylinder, and 8 litres (= about 2 gallons) of distilled water poured over them. Carbonic acid gas was then uninterruptedly, night and day for thirty days, introduced into the cylinder. After the lapse of this time the water was removed by filtration, evaporated, the residue treated with sulphuric acid, and this again removed by evaporation, in order to disengage the siliceous earth, dissolved in the water, filtered, and evaporated, when it yielded a saline mass, composed of potassa, lime, oxide of iron, and magnesia. The carbonated water had therefore decomposed the silicates, which even resist the action of nitro-muriatic acid.

In order to ascertain if the flower-pots might not perhaps exert some influence on the above experiments, some cress was sown both in earthen and also in glass pots, filled with quartzose sand: the analysis of the ashes did not, however, show any difference.

Finally, the following experiment was undertaken:—A platina crucible was filled with the finest commercial platina wire, moistened with distilled water, and then 30 grains of the seed of *lepidium sativum* placed thereupon. This arrangement was then placed on a disc, and covered with a tubulated glass bell, the rim of which was smeared with tallow. A quantity of

mixed gas, consisting of 21 measures of oxygen, 78 measures of azote, and 1 measure of carbon, forming together 100 measures of artificial atmospheric air, were introduced from a gasometer surrounded with ice, into the bottom of the disc, by means of a glass tube. A quantity of artificial air being introduced by this means, answering to ten times the volume of the glass bell, it was supposed that the cold artificial air had expelled the warmer original atmospheric air. The glass bell was then hermetically closed, and the plants only once (as no evaporation could take place) afterwards irrigated with fresh water, by means of a long pipette. The seeds germinated after two days, then evolved leaves, and attained a height of 2 and 3 inches. After a lapse of twenty-six days they began to grow yellow, and to die. Two of the seeds did not germinate. The 28 plants yielded 0.0025 grammes of ashes. 28 good sound of the seed of *lepidium sativum* yielded, when burnt to ashes, likewise 0.0025 grammes of ashes, the same quantity as the plants contained: these therefore had not absorbed anything.

It appears, then, from these experiments—

1. That vegetation may continue for some time at the expense of the inorganic components present in the seed, but ceases as soon as the quantity requisite for vegetation is almost exhausted.

2. That the inorganic components of plants are in no way to be considered as products of vegetative life, formed, perhaps, from elementary substances unknown to us, or as combinations of a peculiar kind of the four known elements which constitute organic bodies.

3. That the quantity of inorganic constituents of plants is not increased by the process of vegetation, but that if prevented from being introduced *ab externo*, they then only contain exactly that quantity which was first present in the seed.—ULEX.

## PRACTICAL PHARMACY.

### ART. VII.—*Charta Vesicatoria*.

1. ACCORDING to Bretonneau, cantharides in powder is rubbed, together with olive or poppy oil, to the consistence of an electuary. A sheet of paper is then taken, and a circle cut out thereof the size and form of the intended blister; this leaf is pasted on some spread plaster, and the mixture of powdered cantharides and oil spread over within the circle to the thickness of from one to two millimetres (= 0.04 to 0.08 inch E.), after which the paper, having served as a pattern, is taken away. Thin blotting paper is then put over the blister, so that it reaches over

the borders, and adheres to the plaster. The oil of the mixture then becomes saturated with the blistering principle of the cantharides, and passes through the blotting paper. The blister thus prepared is placed on the skin where it is intended to act. Such blister is efficacious and clean, and does not leave any part of the cantharides on the skin, as is the case with the common blistering plaster.

2. *Johnson's vesicatory*.—A thin film of oil of cantharides, extracted by ether, is spread over a piece of court plaster. The effect is very powerful.

3. *Trousseau's vesicatory*.—A piece of blotting paper, in the form and size of the intended blister, is cut out; this is attached to a proper piece of spread plaster, and then some drops of ethereal solution of cantharides spread over the paper; after which it is attached to the skin by means of the overhanging spread plaster. This kind of blister is very excellent, since it may easily be carried from one place to another. Its powerful effect takes place generally within eight or nine hours.

4. *On the application of the oily cantharidine, instead of the common blistering plaster*.—Buchner, sen. obtains this preparation by treating cantharides, coarsely bruised, in the displacement apparatus\*, with dilute ether of 0.776 sp. gr. until the ether passes colourless. The greater part of the ether is removed by distillation, and the residue exposed to a gentle heat, until all contents of ether, alcohol, and water, are evaporated. A product of 11 per cent. of the cantharides employed is obtained. It liquefies at from 25° to 30° R. (= 90° to 100° F.), and becomes solid at 20° R. (= 77° F.), having a butyraceous or ointment consistence, is of a greenish yellow colour, and disagreeable benumbing smell. Two or three grains are said to be sufficient for raising a large blister. It is likewise said to be employed internally in the form of emulsions or of pills; or, dissolved in ether, externally as a vesicatory, on taffeta or paper.

5. *Blister-taffeta*.—The apothecary Venturini, of Trieste, has given the following formula in the *Gazzetta Eclettica di Chimica*, of April, 1839:—One pound of cantharides in powder, and 3½ ounces of euphorbium, also in powder, are to be boiled for some minutes with two pounds of alcohol; and, after having been digested for twelve hours, the liquid is pressed therefrom. The residue is again digested for some hours with three pounds more of alcohol, which is in like manner pressed out. The alcohol is then removed from the filtered liquors by distillation, and the solution combined with one ounce of isinglass, dissolved in an infusion of two ounces of spurge laurel (mezereon), in 1½ pound

\* The apparatus of Anthon, described in p. 281 of the ANNALS, will be found well adapted for this purpose. The concentrated ethereal solution might be spread on paper, previously waxed by rubbing the paper on a heated tin plate with white wax.

of water, the latter being previously concentrated by evaporation to ten ounces. The preparation, thus obtained, is then quickly spread over black taffety by means of a brush.

6. Cap and Soubeiran recommend another formula, first proposed by Henry and Guibourt, chiefly because the vesicatory thus prepared quickly produces the desired effect, whilst the pain caused thereby is less keen and lasting than with the former, and the sore produced, sooner heals.

The formula alluded to is as follows:—The green oil of cantharides, obtained by infusing the flies with ether, is melted with double its weight of wax, and this mixture, as in the case of common spread plaster, is laid over a strip of waxed paper or cloth. Cantharidine is frequently disengaged in the middle of the mass in a crystalline form, and the surface becomes covered with small white needles. As this preparation necessarily loses its strength by exposure to the air, it can only be kept in stock in small quantities, and in vessels properly closed. —*Arch. d. Pharm.*

#### ART. VIII.—*Aconitine.*

THIS organic base was discovered by Hesse in the *Aconitum Napellus* L. In the herb it is combined with an acid, the nature of which is at present unknown.

For its preparation, the dry pungent leaves are digested with spirit of wine (best in a Rea's press), and the concentrated tincture mixed with hydrate of lime. The aconitine then remains in solution in the alcoholic liquor. After being separated from the precipitate produced by filtration, the liquor is mixed with dilute sulphuric acid, which precipitates the whole of the lime in the form of gypsum. The spirit of wine is partly recovered by distillation, and the residue [an impure sulphate of aconitine] mixed with water. The rest of the alcohol contained therein is removed by gentle evaporation, and the impure aconitine precipitated by carbonate of potassa.

The precipitate being pressed between paper, is dissolved in spirit of wine, and its colour removed by animal charcoal, when the solution yields, on evaporation, pure aconitine. A further purification and removal of colour may be attained by dissolving it again in sulphuric acid, decomposing the sulphate with hydrate of lime, and extracting the aconitine from the precipitate by ether.

Pure aconitine crystallizes from dilute alcohol in white grains, or it remains behind, if the solution be spontaneously evaporated, as a colourless, shining, and transparent mass. It has no odour, and its taste is at first bitter, then pungent and acrid. It is very poisonous, dilates the pupil, has an alkaline reaction, and perfectly neutralizes acids. It resists the action of the air, easily

fuses without volatilizing, and, if further heated, yields several products of decomposition containing ammonia.

Aconitine is soluble in 50 parts of hot, and in 150 parts of cold water. The hot solution yields no deposit on cooling. It dissolves in spirit of wine, and in ether. Chloride of platina does not precipitate its solutions. The atomic weight is at present unknown.

A simplification of the method of manufacturing aconitine, especially if a larger product could be obtained, would secure to the medical art a valuable remedy.—*Hdwtb. d. Chemie von Liebig u. Poggendorff.*

[We have had occasion to prepare aconitine several times, on account of the exorbitant price demanded for it (3s. per grain), and have found the use of lime far preferable to ammonia, which latter is directed in the Ph. L.—ED.]

#### ART. IX.—*Preparation of Purified Carbonate of Potassa from Raw Potash.*

M. MEYER, of Friedland, manufactures the above in the following manner:—10 parts of raw potash are mixed with 6 parts of water, and allowed to remain (repeatedly stirring) for twenty-four hours in a cool place; the liquor is then filtered and somewhat concentrated by evaporation, meanwhile crystallization is prevented by continually stirring, until the whole mass is nearly cool, when it is decanted into a strainer. The mother liquor, containing chloride of potassium and silicate of potassa, drips off, after which the residue is evaporated to dryness at a gentle heat, then dissolved in an equal quantity of distilled water, and the liquor, after filtration, is again evaporated to dryness.

The raw potash being treated in this manner, no sulphate of potassa is contained in the solution after standing twenty-four hours only, which, however, is the case if the liquid is allowed to stand for a longer time.

The chloride of potassium and the silicate of potassa, on the other hand, are, after standing twenty-four hours, almost entirely dissolved. In order not to disturb the crystallization, the evaporation must not be interrupted either too early, nor must the time be excessively prolonged. In the first instance too much of the product would be lost; in the second the quality of the preparation deteriorated. The exact moment for removing the vessel from the fire is *when the ley begins to assume an opaque appearance*, for the saline film cannot be destroyed whilst boiling by stirring. The evaporation to dryness, especially for the first time, must be executed over a gentle fire, for, if too strongly heated, the siliceous earth, which is to be separated when dissolved a second time, becomes partly soluble by combining with the potassa,

and enters into the preparation. At all events, the direction of the Pharmacopœia (Boruss.) to evaporate *leni calore* deserves attention.

Russian potash, containing 60 per cent. of carbonate of potassa, yielded in this way five pounds of purified carbonate of potassa, and half a pound was left as mother liquor, and nine ounces of soluble salts were afterwards obtained from the residue of raw potash after being extracted with cold water, containing about half a pound of carbonate of potassa.

The purified carbonate of potassa, obtained as above described, contained 1.1 per cent. of chloride of potassium, but no sulphate of potassa.—*Vogel's Notizen*.

[The recent strictures which have been made "in illustration" of the state of pharmacy in England, by the supporters of the Pharmaceutical Society, may give interest to the remarks contained in the above extract. We cannot help expressing our opinion that it must be a morbid desire to find fault, rather than a sincere anxiety to protect the public, when complaint is made of a preparation which, even if the vague instructions of the Pharmacopœia be followed to the letter, may yield as impure a product as that which has been furnished by the respectable sources referred to by the College translator. The price of commercial salt of tartar, as it is termed, is forty shillings per cwt.: an article containing only about two per cent. of impurity may be purchased for fifty-six shillings per cwt. Assuming the dose to be ten grains, the amount of impurity contained in the inferior article is only half a grain, by the critic's own shewing, and such impurity perfectly harmless withal.—ED. A. C.]

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ART. X.—*A New Process for distinguishing and perfectly separating Arsenic from Antimony in the Metallic Spots obtained by Marsh's Apparatus.* By Dr. REMIGIUS FRESENIUS.

NOT long since a process was made known by M. Pettenkofer\* for the further examination of the metallic spots obtained by Marsh's apparatus, especially for distinguishing spots of arsenic from those of antimony, and for discerning the one from the other. This ingenious method simply consists in conducting a stream of sulphuretted hydrogen gas through the glass tube containing the metallic spot in question, meanwhile heating the deposit. Both metals combine with sulphur during this operation; the antimony passes into the black, or more or less orange-red sulphuret of antimony, the arsenic into the yellow sulphuret of arsenic. The different volatility of the two sulphurets, combined with the difference in their colour, then furnishes a means

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\* B. R., Bd. xxvi. Heft. 3,

for discerning the nature of the metallic spot ; since, when both arsenic and antimony are present, the more volatile sulphuret of arsenic always sublimes before the less volatile deposit of sulphuret of antimony.

The experiments of Pettenkofer have, therefore, been repeated here (at Giessen), in Liebig's laboratory, and I myself have repeatedly undertaken them. The conviction to which these experiments led me, is, that the said method, if useful for distinguishing arsenic from antimony, in case of one of the two bodies being present, never suffices for proving with certainty the presence of arsenic in the event of antimony being also present.

The results are, it is true, in the latter case, if well conducted, mostly of such a description that the presence or absence of arsenic may be inferred with probability ; but they never bear the stamp of that positive certainty and undoubted assurance which on such an important subject (M. Pettenkofer thinks his method especially applicable in cases of judicial examinations) must be considered as the only criterion of proof ; for the limits between the greater or lesser volatility of the two metals are not easily distinguished, neither are the colours yellow and orange so well defined as white and black in reference to each other.

If two bodies are mixed or combined with each other, there are two ways of proving the presence of each or of one of them. The bodies are either completely separated from each other in any manner, or they are both, even without separation, placed in such conditions or forms as to show such distinct chymical or physical properties that they may easily be recognized thereby.

The first of these methods is in general the most certain. Among the many methods suggested for the closer examination of metallic spots obtained by Marsh's apparatus, especially for distinguishing arsenic from antimony, the greater part are based on a complete separation of both metals ; and to these methods the reproach has been attached with justice, that their results are not sufficiently sensible to yield the requisite certainty in cases of small quantities only being present.

The method which I am about to describe in the following pages, based likewise on an absolute separation of the arsenic from the antimony, is not subject to this objection. It is based on Pettenkofer's experiments, the repetition of which occasioned the discovery and confirmation of this new process.

As respects its execution, I have to draw attention to several points. I proceed to describe it in detail :—A metallic spot, as large and thick as possible, is procured in the common way by heating the glass tube from which the hydrogen gas containing arsenic or antimony is streaming forth. The first tube is

then changed for a second, third, and so on, until these deposits cease to be perceptible. Dry sulphuretted hydrogen gas is then led through the glass-tubes in an exceedingly slow stream, so that, if lighted at the fine-drawn and nipped-off point, it continues burning at the upper end, and the metallic spot (rather *deposit*) is then heated by a simple spirit-lamp from outside towards the inside; contrary, therefore, to the direction of the stream of gas. The requisite strength of the latter being once ascertained, if the glass-tubes are not too short, after some practice in the process, the operator invariably succeeds in converting the reguline metal, without the slightest loss, into a sulphuret.

A moderately strong stream of dry muriatic acid gas, which may be obtained without trouble by putting some common salt in a good deal of concentrated sulphuric acid, and very slightly heating, is then conducted through the same glass-tubes. Between the vessel from which the gas evolves and the glass-tube containing the sulphuret, another short and wider tube, loosely filled with cotton, is adapted. If the metallic deposit consisted of antimony, the sulphuret of antimony then being alone in the tube disappears immediately, provided it existed merely as a thin film; if the deposit was thicker, in a few seconds, according as the sulphuret of antimony is converted into hydrochloric acid gas and chloride of antimony: this latter being extremely volatile in the stream of muriatic acid gas. If the same is conducted into water, the presence of the antimony may be tested therein by sulphuretted hydrogen, or other re-agents. In case the metallic deposit consisted merely of arsenic, the tube then contains only a yellow sulphuret of arsenic, the whole of which remains unchanged; the muriatic acid gas exerting no influence on sulphuret of arsenic, even when passed for a long time through a tube containing it. Finally, in case of arsenic and antimony being simultaneously present, the sulphuret of antimony of course immediately disappears from the tube, whilst the sulphuret of arsenic remains behind without any change. If the glass-tube is then removed, the drawn out point is closed by fusion, and some solution of ammonia poured into the tube: the remaining yellow deposit immediately disappears: and thus, for a second time, is the conviction obtained that it was really sulphuret of arsenic. By evaporating the liquor containing ammonia on a watch-glass, the whole quantity of arsenic which was present in the metallic deposit is recovered as sulphuret of arsenic, and can be submitted at pleasure to repeated examinations.

The superiority attained by this process consists in that *the arsenic is perfectly isolated, and that it is recognized without being lost*, imparting an especial value to the method above described. None of the very numerous processes hitherto pub-



lished for the same purpose possess these advantages to an equivalent extent.—*Annalen d. Chem. u. Pharm.* Sept. 1842.

[This process, now first described in the English language, is to the analyst undertaking his task for judicial proceedings invaluable; and we freely welcome contemporary journals to extract it from our pages.—Ed.]

ART. XI.—*On Elaterin.* By CONSTANTIN ZWENGER.

If elaterium album is boiled with absolute alcohol until it ceases to assume any colour, and the filtered solution then condensed by evaporation to half its former volume, a white, somewhat greenish powder is obtained on the addition of water, which Morries, who was the first to produce it, termed Elaterin. The colouring substance can be removed by washing with ether, in which elaterin scarcely dissolves. After having caused it to crystallize several times from absolute alcohol, it is obtained in colourless, shining, six-sided laminæ, which may be procured very beautiful if a concentrated solution of pure elaterin is allowed to stand quietly for some time in a narrow and high vessel.

0.335\* grs. of these crystals, dried at 100° C. = 212° F., yielded 0.248 of water, and 0.842 of carbon.

0.450† grs. of the substance yielded 0.3925 of water, and 1.128 of carbon.

This answers, in 100 parts:—

|                  | I.         | II.     |
|------------------|------------|---------|
| Carbon . . . .   | 69.485 . . | 69.292  |
| Hydrogen . . . . | 8.225 . .  | 8.208   |
| Oxygen . . . .   | 22.290 . . | 22.500  |
|                  | 100.000    | 100.000 |

The following table may be inferred therefrom by calculation:—

|                             |           | In 100 parts. |
|-----------------------------|-----------|---------------|
| 20 atoms of Carbon . . .    | 1517.08 . | 69.170        |
| 28     „     Hydrogen . . . | 174.72 .  | 7.971         |
| 9     „     Oxygen . . .    | 500.00 .  | 22.859        |
|                             | 2191.80 . | 100.000       |

Elaterin does not contain any azote, the absence of which I ascertained by the method of Varrentrapp and Will.

0.372‡ grs. of the substance yielded 3.012 platino-muriate of ammonia, corresponding (under the supposition of the residue having been pure platino-muriate of ammonia) in 101 parts to 0.204 azote, which may be ascribed to accidental impurity.

Elaterin fuses precisely at 200° C. = 392° F., previously becoming yellow, and forms, after being fused, a transparent yellowish uncrystallizable mass, which, on cooling, forms fissures.

\* In the original grammes.

† Ditto.

‡ Ditto.

By fusing, elaterin does not lose any part of its weight. At a still higher temperature it decomposes, evolving white fumes of a somewhat pungent odour, which, when lighted, burn with a sooty flame.

It is insoluble in water, and scarcely dissolves in ether. In alcohol it dissolves easily. The solutions do not act on litmus paper.

It likewise remains undissolved by diluted acids and alkalies. By concentrated sulphuric acid it dissolves with a dark-red colour. Water precipitates therefrom a dark-brown mass. Fuming nitric acid dissolves it easily: by the addition of water it is disengaged again perfectly unchanged. Muriatic acid does not dissolve it at all.

I have not succeeded in producing combinations of elaterin with bases. Precipitates are, indeed, obtained, if, *e. g.*, to a solution of nitrate of oxide of silver, or acetate of lead, an alcoholic solution of elaterin is added. These precipitates are, however, nothing but elaterin precipitated by the water of the solutions of the salts. No precipitate ensues on the addition of alcoholic solutions of these salts.—*Ann. d. Chem. u. Ph.: Sept.*

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## REVIEWS.

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ART. XII.—*Chymistry of Animal Bodies.* By THOS. THOMSON, M.D. Regius Professor of Chymistry in the University of Glasgow, &c. &c. A. and C. Black, Edinburgh; Longman and Co. London.

ANIMAL chymistry has hitherto been very superficially studied in England. The examination of urine, calculi, and occasionally a few analyses of the contents of the stomach in cases of poisoning, may be said to include all that has been done in this branch of the science of chymistry. The absence of crystallization in animal principles leaves a doubt on the mind of the experimentalist which even the most careful manipulation does not always remove, whilst the rapid decomposition, of which animal matter is susceptible—never more clearly exemplified than in the laborious investigations of the nature of oxgall, given in the previous and present numbers of this journal—continually interferes with the results, and demands every precaution on the part of the investigator. The work of Dr. T. Thomson, a writer so well and so favourably known to English chymists, will be found an invaluable acquisition to the medical literature of this country; and when the excitement which Liebig's advocacy of certain views stimulates the student to examine for himself, he will refer most gladly to the elaborate details of Dr. T. Thomson. In England few have the boldness to venture on so complete a system of chymistry as the author we refer to; and the chy-

mist who prefers his own investigation to the sometimes coloured views arrived at by others, will select the work we are now noticing as his text-book and guide to animal chymistry, in preference to all others which have appeared in this country, on account of its furnishing the exact particulars to which chymists have at present attained. In this Utilitarian age it is not merely sufficient to point out the value of a work in a scientific point of view: it is necessary to shew in what manner this scientific information can be brought to bear on the arts of life. Perhaps there never was such a field of hidden wealth as lies concealed in the animal world. How comparatively few, if any, are acquainted with the value of the debris which are every day unconsciously wasted in our slaughter-houses, tanneries, dyeing-establishments, &c. &c. Let us hope that such works as the present will furnish the practical chymist with hints which, followed out, may lead to rich reward. The ground is almost untrodden. The masters of the art, with but few rare exceptions, are busy verifying their conjectures and theories; whilst he who prefers the substance to the shadow, whose occupation is the application of chymistry to arts and manufactures, will find the field deserted—a field, to quote the words of Liebig, referring to another branch of the subject, “wherein the investigator has only to stoop to pick up gold.”

We conclude our present notice with the following extract “On the Colouring Matter of the Ancient Purple Dye:”

“*Colouring Matter of the Ancient Purple Dye.*—The most celebrated and precious of all the ancient dyes was the *purple*. The method of dyeing which was monopolised by the Tyrian dyers, who seem to have been acquainted with it at a very early period. The dye stuff was a white clammy liquor, obtained from a variety of univalve shells found on the coast of the Mediterranean. Pliny divides these shells into two genera, which he distinguishes by the names of *Buccinum* and *Purpura*. About two drops of the liquid was obtained from each fish, by opening a reservoir placed in the throat. To avoid the trouble of extracting it from every individual fish, they were often bruised in a mortar. The liquor when extracted was mixed with salt to prevent putrefaction. It was then diluted with five or six times its weight of water, and kept moderately hot in leaden or tin vessels for the space of ten days, during which the liquor was often skimmed to separate impurities. After this the wool, previously washed, was immersed, and kept therein for five hours. It was then taken out, carded, and immersed again, and kept in the liquid till all the colouring matter was extracted. Pliny informs us that the Tyrians first dyed their wool in the liquor of the *Purpura*, and afterwards in that of the *Buccinum*.

“Another mode of preserving the purple dye was by covering it with honey. Plutarch, in his life of Alexander the Great, informs us that there was found in the King of Persia's palace at Susa five thousand talents of the *purple of Hermione*, which, though it had been laid up one hundred and ninety years, retained its first freshness and beauty. The reason assigned for this is, that the purple wool was combed with honey and the white with white oil.

“The wool thus dyed was so costly that, in the time of Augustus, each pound of it was sold for 1000 Roman denarii (about £36 sterling).

“The art of dyeing this colour came at last to be practised only by a few individuals maintained by the emperors for that purpose. It was interrupted about the twelfth century, and all knowledge of it was lost. But in the year 1683, Mr. Cole, of Bristol, being told that a person at a sea-port in Ireland gained a living by making linen with a red coloured dye stuff, was induced to make inquiry into

his mode of proceeding. He found that the individual in question made use of a white liquor in the head of the *Buccinum lapillus* of Linnæus—a shell very common on our coasts.

“Mr. Cole procured this liquor from the fish, and stained linen with it. When exposed to the light of the sun the stain became first green, then blue, and finally a purple red.

“These experiments of Cole were afterwards repeated successfully by M. Jussieu, M. Reaumur, and M. Dubamel. They observed the same succession of colours. And they mention also a fetid smell, like a mixture of garlic and assafœtida, given out while it was changing its colours. This smell had been also noticed by Cole. As no experiments on this curious liquid have been made by modern chymists, we are still ignorant of its nature and properties. I have mentioned it here merely to draw the attention of such chymists as, living upon the sea-coast, may have it in their power to procure the shell fish that yield it.”

### ART. XIII—*Hyoscyamus Niger*.

*To the Editors of the Annals of Chymistry and Pharmacy.*

GENTLEMEN,—That the botanical character of so important a plant as *Hyoscyamus niger*, after having been more than thirty years in our Pharmacopœia, should still remain to be settled by writers on *Materia Medica*, is rather surprising. The *Hyoscyamus niger* that Alston, Bergius, and J. A. Murray, wrote upon, is so well described by those fathers of modern vegetable *Materia Medica*, that no doubt can exist respecting the duration of the plant, for they do not only state that it is a biennial plant, but mention circumstances which prove that it could not possibly be an annual. The roots having been dug up early in the spring, and eaten by mistake for parsnips, proves that the plant must have been biennial; for no annual plant, growing spontaneously, could have roots that any person of common sense and observation would take for parsnips.—“*Radices recentes primo vere ab imperitis per errorem subinde effodiuntur loco postinacæ*,” &c. (Bergius).

The fact of the roots having been eaten for parsnips is stated in many works on *Materia Medica* and Toxicology, but I am not aware that any of our writers of the present day have considered the fact as bearing upon the question of duration: some have called the plant annual, and have not mentioned any biennial kind; some have called it biennial, and have not mentioned any annual sort; some have called it both, stating that there are two varieties, but leaving us in the dark as to the original species. As so much doubt exists as to the duration of the old indigenous *Hyoscyamus niger*, it behoves the practical man to look into Nature for himself; and if he wants a little practical knowledge beyond that which he possesses, he may gain from the herb-gathers and herb-sellers some useful information that systematic works will not afford him. I hope, now that great attention is given to pharmacy, some good practical work will soon appear on Pharmaceutico-Botany.

I am, sir, your obedient servant,

Dec. 4, 1842.

HERBARIUS.

| NOMINA.                                 | FORMULÆ.                                                  |
|-----------------------------------------|-----------------------------------------------------------|
| <i>bi Boras Cadmicus</i> . . . . .      | $\dot{\text{Cd}} \ddot{\text{B}}^{\text{a}}$ . . . . .    |
| <i>Boras Calcicus</i> . . . . .         | $\dot{\text{Ca}} \ddot{\text{B}}$ . . . . .               |
| <i>bi Boras Calcicus</i> . . . . .      | $\dot{\text{Ca}} \ddot{\text{B}}^{\text{a}}$ . . . . .    |
| <i>Boras Cericus</i> . . . . .          | $\ddot{\text{Ce}}_2 \ddot{\text{B}}^{\text{a}}$ . . . . . |
| <i>bi Boras Cericus</i> . . . . .       | $\ddot{\text{Ce}}_2 \ddot{\text{B}}^{\text{a}}$ . . . . . |
| <i>Boras Cerosus</i> . . . . .          | $\dot{\text{Ce}} \ddot{\text{B}}$ . . . . .               |
| <i>bi Boras Cerosus</i> . . . . .       | $\dot{\text{Ce}} \ddot{\text{B}}^{\text{a}}$ . . . . .    |
| <i>Boras Chromicus</i> . . . . .        | $\ddot{\text{Cr}}_2 \ddot{\text{B}}^{\text{a}}$ . . . . . |
| <i>bi Boras Chromicus</i> . . . . .     | $\ddot{\text{Cr}}_2 \ddot{\text{B}}^{\text{a}}$ . . . . . |
| <i>Boras Cobalticus</i> . . . . .       | $\dot{\text{Co}} \ddot{\text{B}}$ . . . . .               |
| <i>bi Boras Cobalticus</i> . . . . .    | $\dot{\text{Co}} \ddot{\text{B}}^{\text{a}}$ . . . . .    |
| <i>Boras Cupricus</i> . . . . .         | $\dot{\text{Cu}} \ddot{\text{B}}$ . . . . .               |
| <i>bi Boras Cupricus</i> . . . . .      | $\dot{\text{Cu}} \ddot{\text{B}}^{\text{a}}$ . . . . .    |
| <i>Boras Cuprosus</i> . . . . .         | $\dot{\text{Cu}}_2 \ddot{\text{B}}$ . . . . .             |
| <i>bi Boras Cuprosus</i> . . . . .      | $\text{Cu}_2 \ddot{\text{B}}^{\text{a}}$ . . . . .        |
| <i>Boras Ferricus</i> . . . . .         | $\ddot{\text{Fe}}_2 \ddot{\text{B}}^{\text{a}}$ . . . . . |
| <i>bi Boras Ferricus</i> . . . . .      | $\ddot{\text{Fe}}_2 \ddot{\text{B}}^{\text{a}}$ . . . . . |
| <i>Boras Ferrosus</i> . . . . .         | $\dot{\text{Fe}} \ddot{\text{B}}$ . . . . .               |
| <i>bi Boras Ferrosus</i> . . . . .      | $\dot{\text{Fe}} \ddot{\text{B}}^{\text{a}}$ . . . . .    |
| <i>Boras Glucinicus</i> . . . . .       | $\ddot{\text{G}}_2 \ddot{\text{B}}^{\text{a}}$ . . . . .  |
| <i>bi Boras Glucinicus</i> . . . . .    | $\ddot{\text{G}}_2 \ddot{\text{B}}^{\text{a}}$ . . . . .  |
| <i>Boras Hydrargyricus</i> . . . . .    | $\dot{\text{Hg}} \ddot{\text{B}}$ . . . . .               |
| <i>bi Boras Hydrargyricus</i> . . . . . | $\dot{\text{Hg}} \ddot{\text{B}}^{\text{a}}$ . . . . .    |
| <i>Boras Hydrargyrosus</i> . . . . .    | $\dot{\text{Hg}}_2 \ddot{\text{B}}$ . . . . .             |
| <i>bi Boras Hydrargyrosus</i> . . . . . | $\dot{\text{Hg}}_2 \ddot{\text{B}}^{\text{a}}$ . . . . .  |
| <i>Boras Hydricus</i> . . . . .         | $\dot{\text{H}}_2 \ddot{\text{B}}$ . . . . .              |
| — sesqui Hydricus . . . . .             | $\dot{\text{H}}_3 \ddot{\text{B}}^{\text{a}}$ . . . . .   |

| PONDERA ATOMORUM. |                    | PARTES CENTESIMALES. |       |                      |
|-------------------|--------------------|----------------------|-------|----------------------|
| O = 100           | H <sub>+</sub> = 1 | + E                  | — E   | H vel H <sub>+</sub> |
| 1669,18           | 183,75             | 47,74                | 52,26 |                      |
| 792,23            | 63,49              | 44,94                | 55,06 |                      |
| 1228,43           | 98,44              | 28,98                | 71,02 |                      |
| 2758,01           | 221,00             | 52,59                | 47,41 |                      |
| 4066,62           | 325,86             | 35,64                | 64,36 |                      |
| 1110,91           | 89,02              | 60,75                | 39,25 |                      |
| 1547,11           | 123,97             | 43,61                | 56,39 |                      |
| 2312,25           | 185,28             | 43,41                | 56,59 |                      |
| 3620,86           | 290,14             | 27,72                | 72,78 |                      |
| 905,20            | 72,54              | 51,81                | 48,19 |                      |
| 1341,40           | 107,49             | 34,96                | 65,04 |                      |
| 931,90            | 74,68              | 53,19                | 46,81 |                      |
| 1368,10           | 109,63             | 36,23                | 93,77 |                      |
| 1327,60           | 106,38             | 68,67                | 31,33 |                      |
| 1763,80           | 141,33             | 50,54                | 49,46 |                      |
| 2287,03           | 183,26             | 42,84                | 57,16 |                      |
| 3595,64           | 288,12             | 27,21                | 72,79 |                      |
| 875,41            | 70,15              | 50,17                | 49,83 |                      |
| 1311,61           | 105,10             | 33,49                | 66,51 |                      |
| 2271,14           | 181,99             | 42,38                | 57,62 |                      |
| 3579,75           | 286,85             | 26,89                | 73,11 |                      |
| 1802,03           | 144,40             | 75,79                | 24,21 |                      |
| 2238,23           | 179,35             | 61,02                | 38,98 |                      |
| 3067,85           | 245,83             | 85,78                | 14,22 |                      |
| 3504,05           | 280,78             | 75,10                | 24,90 |                      |
| 548,68            | 43,96              |                      | 79,50 | 20,50                |
| 1209,85           | 96,95              |                      | 72,11 | 27,89                |

| NOMINA.                                    | FORMULÆ.                                               |
|--------------------------------------------|--------------------------------------------------------|
| <i>Boras tri Hydricus</i> . . . . .        | $\text{H}_3 \ddot{\text{B}}$ . . . . .                 |
| <i>Boras Kalicus</i> . . . . .             | $\text{K} \ddot{\text{B}}$ . . . . .                   |
| <i>bi Boras Kalicus</i> . . . . .          | $\text{K} \ddot{\text{B}}^s$ . . . . .                 |
| <i>Boras Lithicus</i> . . . . .            | $\text{L} \ddot{\text{B}}$ . . . . .                   |
| <i>bi Boras Lithicus</i> . . . . .         | $\text{L} \ddot{\text{B}}^s$ . . . . .                 |
| <i>Boras Magnesticus</i> . . . . .         | $\text{Mg} \ddot{\text{B}}$ . . . . .                  |
| — — cum aqua . . . . .                     | $\text{Mg} \ddot{\text{B}} + 8\text{H}_2$ . . . . .    |
| <i>bi Boras Magnesticus</i> . . . . .      | $\text{Mg} \ddot{\text{B}}^s$ . . . . .                |
| <i>Boras Magnesticus basic. (Boracit.)</i> | $\text{Mg}^s \ddot{\text{B}}^s$ . . . . .              |
| <i>Boras Manganosus</i> . . . . .          | $\text{Mn} \ddot{\text{B}}$ . . . . .                  |
| <i>bi Boras Manganosus</i> . . . . .       | $\text{Mn} \ddot{\text{B}}^s$ . . . . .                |
| <i>Boras Molybdicus</i> . . . . .          | $\text{Mo} \ddot{\text{B}}^s$ . . . . .                |
| <i>bi Boras Molybdicus</i> . . . . .       | $\text{Mo} \ddot{\text{B}}^s$ . . . . .                |
| <i>Boras Molybdosus</i> . . . . .          | $\text{Mo} \ddot{\text{B}}$ . . . . .                  |
| <i>bi Boras Molybdosus</i> . . . . .       | $\text{Mo} \ddot{\text{B}}^s$ . . . . .                |
| <i>Boras Natricus</i> . . . . .            | $\text{Na} \ddot{\text{B}}$ . . . . .                  |
| — sesqui Natricus . . . . .                | $\text{Na}^s \ddot{\text{B}}^s$ . . . . .              |
| <i>bi Boras Natricus</i> . . . . .         | $\text{Na} \ddot{\text{B}}^s$ . . . . .                |
| — — — cum aqua . . . . .                   | $\text{Na} \ddot{\text{B}}^s + 10\text{H}_2$ . . . . . |
| — — — octaëdr. . . . .                     | $\text{Na} \ddot{\text{B}}^s + 5\text{H}_2$ . . . . .  |
| <i>Boras Niccolicus</i> . . . . .          | $\text{Ni} \ddot{\text{B}}$ . . . . .                  |
| <i>bi Boras Niccolicus</i> . . . . .       | $\text{Ni} \ddot{\text{B}}^s$ . . . . .                |
| <i>Boras Palladosus</i> . . . . .          | $\text{Pd} \ddot{\text{B}}$ . . . . .                  |
| <i>bi Boras Palladosus</i> . . . . .       | $\text{Pd} \ddot{\text{B}}^s$ . . . . .                |
| <i>Boras Platinicus</i> . . . . .          | $\text{Pt} \ddot{\text{B}}^s$ . . . . .                |
| <i>bi Boras Platinicus</i> . . . . .       | $\text{Pt} \ddot{\text{B}}^s$ . . . . .                |
| <i>Boras Platinosus</i> . . . . .          | $\text{Pt} \ddot{\text{B}}$ . . . . .                  |

| PONDERA ATOMORUM. |                    | PARTES CENTESIMALES. |       |                      |
|-------------------|--------------------|----------------------|-------|----------------------|
| O = 100           | H <sub>2</sub> = 1 | + E                  | — E   | H vel H <sub>2</sub> |
| 1547,29           | 123,98             |                      | 56,38 | 43,62                |
| 1026,12           | 82,23              | 57,49                | 42,51 |                      |
| 1462,33           | 117,18             | 40,34                | 59,66 |                      |
| 616,54            | 49,41              | 29,25                | 70,75 |                      |
| 1052,74           | 84,36              | 17,13                | 82,37 |                      |
| 694,56            | 55,66              | 37,20                | 62,80 |                      |
| 1594,40           | 127,77             | 16,20                | 27,36 | 56,44                |
| 1130,76           | 90,61              | 22,85                | 77,15 |                      |
| 2519,87           | 201,92             | 30,76                | 69,24 |                      |
| 882,10            | 70,69              | 50,55                | 49,45 |                      |
| 1318,30           | 105,64             | 33,82                | 66,18 |                      |
| 1670,93           | 133,89             | 48,39                | 51,61 |                      |
| 2543,34           | 203,80             | 31,40                | 68,60 |                      |
| 1134,73           | 90,93              | 61,56                | 38,44 |                      |
| 1570,93           | 125,88             | 44,47                | 55,33 |                      |
| 827,11            | 66,28              | 47,26                | 52,74 |                      |
| 2045,10           | 163,87             | 57,24                | 42,66 |                      |
| 1263,31           | 101,23             | 30,94                | 69,06 |                      |
| 2388,10           | 191,36             | 16,37                | 36,53 | 47,10                |
| 1825,70           | 146,30             | 21,41                | 47,79 | 30,80                |
| 905,38            | 72,59              | 51,82                | 48,18 |                      |
| 1342,08           | 107,54             | 35,00                | 65,00 |                      |
| 1202,11           | 97,33              | 63,17                | 36,29 |                      |
| 1368,31           | 131,28             | 46,75                | 53,25 |                      |
| 2305,91           | 184,77             | 62,17                | 37,33 |                      |
| 3178,32           | 254,68             | 45,10                | 54,90 |                      |
| 1769,71           | 141,41             | 75,35                | 24,65 |                      |



## MEETINGS OF LEARNED SOCIETIES.

## MICROSCOPICAL SOCIETY.

November 16, 1842.

PROF. LINDLEY, PRESIDENT, IN THE CHAIR.

A SECOND paper was read by A. B. Hassal, Esq., "On the Destruction of Fruit by Fungi." The author stated that he had obtained more conclusive evidence of the influence of fungi in producing decay in fruit, from the fact that this decay can be communicated at will by inoculating sound fruit with the changed matter containing the spawn of the fungi; and the effects of this inoculation become manifest in twenty-four hours. The author concluded by observing that the decay of fruit might be retarded by coating the surface over with a varnish which would exclude the influence of the atmosphere. Mr. Hassal then made a few observations on the peculiar form of spiral vessel which he had found in the vegetable marrow. A letter was read from the Rev. J. B. Reade upon various matters. The author sent for inspection a specimen of cocoa-nut cake, covered with a dense mass of minute filamentary fungi. The cake, which has been proposed as a substitute for oil cake, he found to contain a large quantity of ammonia, and the fungi growing on it were remarkable for the quantity of nitrogen they contained. The author then directed attention to a statement in Liebig's Organic Chymistry, p. 114, that "the nitrogen in the air is applied to no use in the animal economy." Mr. Reade expressed his intention of hereafter endeavouring to prove that it tends directly to the production of many millions of pounds of carbonate of ammonia in the *breath of man*. Although the quantity of this agent in a single expiration may be too small to be "quantitatively ascertained by chymical analysis," it is discoverable by the microscope, as was afterwards shown in a specimen which accompanied the communication. Specimens of microscopic animalcules, which had been sent up alive from Lewes by E. Jenner, Esq., through the post, were exhibited by Mr. Ross. They had been enclosed, with the weeds they were attached to, in pieces of wet linen, covered over with tin foil.

*Athenaeum.*

## SOCIETY OF ARTS.

Nov. 30, 1842.

G. MOORE, Esq. Vice-President, in the Chair

A PAPER, by Mr. White, was read, "On Keene's Marble Cement." It is described as a combination of sulphate of lime and alum. The gypsum undergoes the same preparation as for plaster of Paris, being deprived of its water of crystallisation by baking. It is then steeped in a saturated solution of alum; and this compound, when recalcined and reduced to a powder, is in a fit state for use. The cement has been most extensively applied as a stucco; but the finer qualities, (when coloured by the simple process of infusing mineral colours in the water with which the cement powder is finally mixed for working,) being susceptible of a high degree of polish, produce beautiful imitations of mosaic, and other inlaid marbles, scagliola, &c. The cement is not adapted to hydraulic purposes, or for exposure to the weather, but has been used as a stucco in the internal decorations of Windsor and Buckingham Palaces. From its extreme hardness, it has been found serviceable when used for imbedding and setting the tiles of tessellated pavements, &c.; and has been adopted for this purpose at the French Protestant Church, the new fire-proof chambers in Shorter's Court, and the Reform Club House.

In the course of the discussion which followed, Mr. C. H. Smith and Mr. Lee adverted to the extreme hardness of the cement as its principal recommendation, when applied as stucco and for mouldings.—*Ibid.*

\* \* \* Communications, Books for Review, &c. are requested to be addressed—  
—To the Editors of the ANNALS OF CHYMISTRY, care of Messrs. Longman, Brown, and Co. Paternoster Row."

WILSON AND OGILVY, 57, SKINNER STREET, SNOWHILL, LONDON.

THE  
ANNALS OF CHYMISTRY  
AND  
PRACTICAL PHARMACY.

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No. 12.] FRIDAY, DECEMBER 16, 1842. [Vol. I.

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THE ADULTERATION OF DRUGS.

ACCORDING to GOLDSMITH, this happy island is visited every season by some new epidemic terror. One year this cruel calamity appears in the shape of a comet with a fiery tail, in another it threatens like a flat-bottomed boat, and when he wrote, it was a panic touching mad dogs.

The medical profession, besides their share in these public terrors, have more technical distresses of their own; and at present the adulteration of drugs is one of the chief topics of discontent. In this instance, as well as those cited by the essayist, it is clear that there is some truth at bottom, yet it is equally obvious that the facts are distorted by exaggeration. Nay, in instances, it may even happen the announcement of adulteration is rather the expression of envy than of indignation :

*Thy wish was father, Harry, to the thought !*

But, leaving the uninformed or the ill-intentioned to kill the giants of their own making, let us indulge in a few comments on the adulterations which actually exist.

In the first place, there is a large class of adulterations where the chief blame must be borne by the retailer. It is he who breaks ground in the field of fraud; and while he seduces the wholesale dealer into his devious path, he demonstrates to him that his own aim is money, money alone :

*Querenda pecunia primum,  
Virtus post nummos.*

Let us take a glaring instance.

It is well known that the so called powdered seeds or roots of many plants, as Anise, Fenugreek, Cumin, Turmeric, Ginger,

and Liquorice, may be purchased *all round* (as the phrase is) and, under all the variations of the market, at twenty-eight shillings per cwt. It is equally well known that the mere cost of having the genuine seeds ground or powdered amounts from not less than twenty-eight to thirty-six shillings per cwt.; while the prices of the several articles in the drug market, at this moment, are as follows:—

| ARTICLE.              | Cost per cwt. | Grinding.<br>per lb. | Loss<br>per cwt. | Sophisticated<br>per cwt. | Fair price of<br>genuine drug<br>per cwt. |
|-----------------------|---------------|----------------------|------------------|---------------------------|-------------------------------------------|
| Anisi Germ. cwt. . .  | s. 42         | d. 3                 | lbs. 8½          | s. 28                     | s. 112                                    |
| " Alicant, cwt. . .   | 50            | 3                    | 8½               |                           | 120                                       |
| Fenugreek, cwt. . .   | 28            | 3                    | 10               | 28                        | 84                                        |
| Zingib. Jam. cwt. .   | £8. 8s.       | 4                    | 12½              | 28                        | 2. 4d. lb.                                |
| " Malabar, cwt.       | 42            | 4                    | 12½              |                           | 112                                       |
| Glycyrrh. rec. cwt. . | 60            | 3                    | 14½              | 28                        | 112                                       |
| " decoct. lb. .       | 2. 6d.        | 6                    | 8½               |                           | 3. 8d. lb.                                |
| Curcuma Beng. cwt.    | 28            | 3                    | 10½              | 28                        | 72                                        |
| " China, cwt.         | 34            | 3                    | 10½              |                           | 84                                        |
| Enula Camp. cwt. .    | 56            | 3                    | 10               | 28                        | 112                                       |

Now, how are we to brand this traffic with sufficient infamy? All the parties who carry it on are aware of its nature; all, we should say, except the rude, unlettered customers, to whom this trash is chiefly sold.

The retailer, when he requires the factitious compound, writes, not for powdered anise seed, but for Pulv. anisi comp. The wholesale druggist replies he does not keep it, but *will get it*. It is sufficient for every honest man to know that it is obtained and supplied; but the damning fact remains, that the several dealers engaged in this knavish traffic gain a greater per centage than by vending the genuine drug. Moreover, the stuff is sold principally to farriers, grooms, and carmen, whose obtuseness is supposed to be a sufficient guarantee for impunity.

Again, when Dr. ROBERT DUNDAS THOMSON told the House of Commons that one chest of bark was powdered into thirty, he must have drawn largely upon his own imagination; nevertheless, frauds, in a less exaggerated form, constantly take place.

Some persons send drugs to the mill, and order the same weight to be returned in powder, in spite of *gruffs*, and losses by drying and powdering. The grinder having learned from this order the elastic conscience of his employer, finds his own ex-

tensible likewise ; and, between the two, the genuine drug expands like gold leaf.

The poor carman hoards up a portion of his scanty gains to supply his horses with this trash : the liberally educated retailer, availing himself of his customer's ignorance, sells him at ten-pence a pound that which is intrinsically worth two-pence ; while the high-minded and honourable wholesale druggist vends at four-pence half-penny that which is sold at three-pence by the grinder. Thus each obtains a profit of at least 50 per cent., and the retailer 100 per cent. : had the article been genuine the profits would not have averaged half so much.

Those who hanker after cheap drugs, and who delight in monthly price lists, may derive a useful lesson from these facts. From the earnest competition of traders, it is inevitable that all price lists which are sent out periodically must represent the value of inferior goods, in order to prepare for the variation of the market ; and if it is once found that a retailer will receive a second-rate article, he may rely upon it that he will become a main prop (if not the prey) of second-rate houses.

It is almost useless to address exhortations to those implicated in these gainful but dishonest pursuits ; but could the simple facts be communicated to the farriers and grooms, who are the unconscious buyers of mock drugs, their consumption would decrease most materially.

The price of saffron in the drug market has recently been fifty-seven shillings per pound ; while a saffron, acknowledged on all hands to be an admixture with oil and marygolds, has been sold at thirty-five shillings ; the retailer being the only exception to this frank and general avowal of its demerits, and his excuse being that the mixture is only used for birds\*.

Alexandrian Senna, as it is termed, being the broken leaves of various plants, some astringent, and others purgative†, is another remarkable instance. Every one protests against the

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\* This drug is under the management of a merchant in the neighbourhood of the Bank, who buys the genuine Spanish saffron in London, and ships it to Rotterdam, where it is duly oiled and mixed. It is then re-shipped to England, and meets with a ready sale. The test of the purity of saffron by suspension in water is fallacious, and has deceived the best judges ; but if this spurious kind is enveloped in paper and dried, instead of becoming friable and easily powdered, it soils the paper, and can be reduced to powder only with the greatest difficulty.

† It is even said to be adulterated with the poisonous leaves of the *Coriaria myrsifolia*.

adulteration, and every one continues to sell the adulterated cathartic. MEHEMET ALI is stigmatized as the original mixer ; but could we inform this shrewd and judicious potentate that retailers pay eight-pence per ounce for the selected leaves, while he can only obtain eighteen-pence a pound for his mixture, he would not be slow to learn that honesty is the best policy, and a few bales of sound and pure Alexandrian senna might find their way to England. " But would the revilers of adulteration buy it ?" is the query which causes the importer to hesitate. Well does he know that for every drum of virgin scammony worth twenty-eight shillings per pound in bond, that leaves Botolph Wharf or Hall's Quay, there are twenty drums of Aleppo (as it is termed) worth eight shillings commercially, and nothing intrinsically. Until the public learn that expensive drugs are not the dearest in the long run, these frauds will continue.

Howard's carbonate of soda is sold by the really conscientious druggist at four-pence per ounce ; while carbonate of soda is ticketed up at a corner thoroughfare for six-pence the pound, or less than a tenth of the higher price ; and how rarely can the consumer judge of the superiority of the former to the latter !

There is another practice, which is not so much adulteration as the substitution of one article for another. For example, Spanish juice is used for ext. glycyrrhizæ ; Cape aloes for ext. aloës spicat. ; tinct. opii, with simple syrup and caramel, plays the part of syrup of poppies ; dried blood, with catechu and ammonia, are sold for grain musk worth six pounds sterling the ounce. Empl. canthar. is sharpened with powdered euphorbium ; and a mixture of creasote, picamar,\* and light oil† of tar, of sp.gr. 1·062, and whose boiling point is 223° F., passes for pure creasote which should have a sp. gr. of 1·037, and whose boiling-point is 397·6 F.‡ The substitution of equal measures of rectified spirit

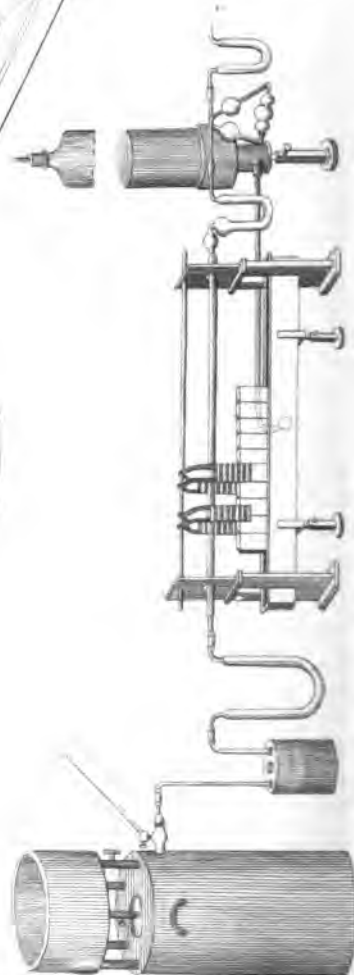
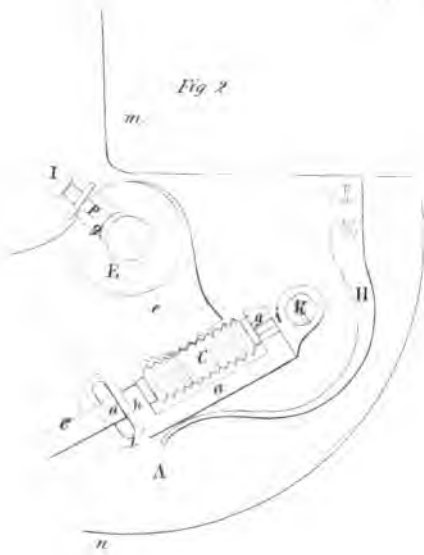
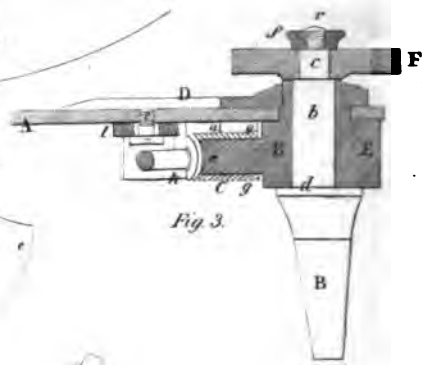
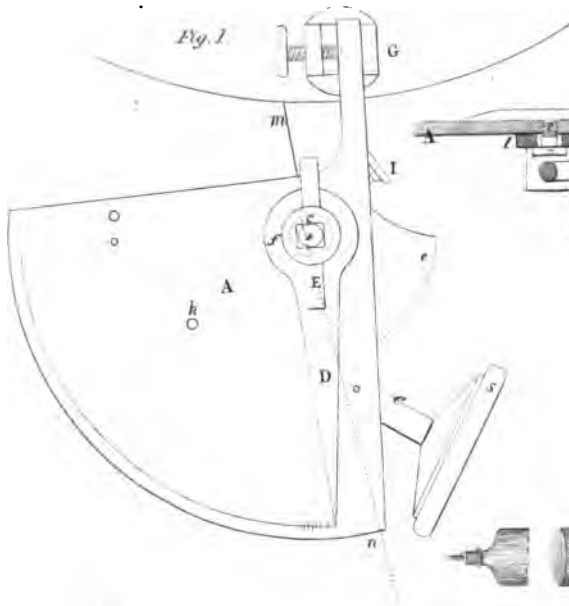
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\* The specific gravity of picamar is 1·095, of paraffine 0·87, of capnomore 0·977, and of eupione 0·655. See also ANNALS, p. 270. Pure creasote forms two combinations with distilled water at ordinary temperatures. The one is a solution of 1·25 parts of creasote in 100 parts of water ; whilst the other is a solution of 10 parts of water in 100 parts of creasote.

† Picamar is detected by adding a somewhat concentrated solution of pure potash to the suspected creasote : should this latter principle be present to any extent, the combination will solidify into a mass of crystals within twenty-four hours. Pure creasote remains fluid with the alkali.

‡ Bers. Lehrbuch, 4th ed. by Woehler, vol. viii., p. 567 ; Brussels ed. by Valerius, t. iii. p. 421 ; also J. Dumas, *Traité de Chimie appliquée aux arts*, t. v. p. 660.





and spring water for five pounds of rectified spirit and three of distilled water, may rank, after what we have adduced, as a comparatively minor transgression.

But a better era, we hope, is fast approaching, when the chartered druggist will repudiate such practices, as alike unjust and inexpedient, and will leave them, if they must still exist, to the Pariahs of the profession.

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## CHEMISTRY, OPERATIVE AND EXPERIMENTAL.

ART. II.—*Apparatus for Organic Analysis.* By O. L. ERDMANN and R. F. MARCHAND.

AMONG the various modifications which have been made in Liebig's apparatus for organic analysis, by which it has been attempted to ensure the perfect combustion of the carbon contained in the matter to be analysed under all circumstances, and to determine the hydrogen with the utmost precision possible, that described by Hess (in the *Journ. f. Practische Chemie*, xvii. 98) seems to answer the purpose best, and we have employed it for several years with the best results. We do not deny that the common process, to the general introduction of which organic chemistry is indebted for its most important advances, possesses many advantages on account of its simplicity and easy application, which are not attained by the more complicated apparatus, and we are far from recommending, therefore, its expulsion from laboratories. In some cases, however, where, during analysis by the ordinary method, differences occur in the contents of carbon, arising from unusual difficulty in effecting the combustion of substances under analysis, as well as in cases where the bodies under combustion contain only a very slight quantity of hydrogen, we consider the application of controlling experiments, by effecting combustion by the aid of a stream of oxygen, as highly necessary for the purpose, and even indispensable. It is true that an evolution of oxygen may be produced in the common arrangement, by the introduction of chlorate of potassa in the hinder part of the tube of combustion; its regulation, however, is, as every one knows who may have employed this method, attended with peculiar difficulty; and, besides this, the combustion of the reduced copper requires such a quantity of oxygen, that the end sought to be attained cannot be completely gained by merely a small quantity of chlorate of potassa. On the other hand, the combustion in a stream of oxygen gas from a gasometer, does not offer the slightest inconvenience.

It must finally be granted, that the peculiar advantage of



Hess' apparatus, consists in that, when once arranged, it admits of the execution of an analysis in much less time than by the common method. It is not requisite, in this case, to pump out and dry the tube of combustion after the oxide of copper has been once heated to redness; and if several analyses are to be executed one after the other, the space of time required for each of them will be found not to exceed more than two hours on an average.

These advantages, as well as the convenience of being able to undertake the analysis in any room, seemed to us of so great value, that we willingly yield to the entreaties addressed to us from several quarters, in offering, for the examination of chymists, a detailed description of our method. We consider the construction of the usual apparatus as generally known, and refer in this respect to the translation by Messrs. Griffin, of Glasgow, published by Mr. Tegg, Cheapside, merely making those alterations which we consider as useful or necessary.

The accompanying plate (the arrangement in perspective is referred to) gives a sufficiently accurate idea of the apparatus, representing, however, only one of the two gasometers. A table which has been described by Hess, has not been used by us.

The gasometer, constructed in the usual manner, is filled with pure oxygen gas, evolved from chlorate of potassa (see *ANNALS*, p. 74). The gas enters from the gasometer either as represented in the drawing, into a two-necked bottle filled with sulphuric acid, or into Liebig's three-bulb apparatus, made of rather large dimensions, and filled with sulphuric acid, by which operation it loses the greater part of its aqueous vapour. This apparatus serves, at the same time, for the purpose of exactly judging the rapidity of the current of gas. In order to regulate correctly the movement of the tap attached to the gasometer, the former is either connected with a long level, as in the sketch, or a micrometer screw is adapted to the tap, by which means the slightest movement may be produced with the greatest accuracy.

We found convenient for this purpose an arrangement which will be presently described, (and which in the plate is figured in outline) and which may be employed in all cases with great advantage, in order to accurately regulate the stream of any gas from the gasometer.

Fig. 1 is a view of the whole arrangement from above.

Fig. 2, from beneath.

Fig. 3 is a section to *m n*.

The same parts are in all the sketches indicated by the same letters.

The tap B (fig. 3) has, immediately over its union, an addition *d* supporting the arrangement, surrounding its cylindrical

lengthened tube *b*, and moving freely around this cylinder until the plate *g* (fig. 2) is pressed against the cylinder *b* by the screw *I*, and its free motion is thus prevented by friction.

The cylinder *b* (fig. 3) is quadrangular on its upper end, in order to admit the stop *F*, and then terminates in a screw *r*. The matrix of the screw *f* serves for the purpose of closely uniting the stop *F* with the tap. The union *E*, by which the whole arrangement is pushed on the tap, has beneath a piece of micrometer wheel, on which the micrometer screw *C* acts. If the screw *I* (fig. 2) is then screwed on, the tap is at the same time turned by the friction of the plate *g* on the cylinder *b*, as soon as the micrometer wheel *e* is acted upon by the screw *C*.

This screw is united with the plate *A*, which may be moved around the union *E*, drawn out behind to a branch, which is formed into an adjusting fork adapted to the covering plate of the gasometer in such manner that the plate *A*, and therefore also the screw *C*, are then immoveably united with the gasometer. The micrometer screw *C* (fig. 2) fits at the ends of the bow *a* into rests provided at *g* with a cover; at *h* without a cover. This bow has a blade at *i*, through which the screw *K* passes, uniting at this point the bow with the plate *A* in such a manner that it turns round *K*. This bow is united at the end *h* with the plate *A* by the screw *o*, passing through the laminar continuation *C*.

The spring *H*, acting from behind against the bow *a*, presses the screw *C* against the wheel *e*, thus preventing any dead movement of this screw, and allowing a free movement of the tap at its upper end on the stop, by interrupting the action of the screw *C* by the advance of its head *s*. The union *E*, together with the tap and wheel *e* attached to it, also the handle *D*, may then be freely moved.

The handle *D* indicates on the scale at the upper surface of the plate *A* the extent of the movement.

Both hands of the experimenter are required for the greater movement just described, since he has to seize with one of them the head of the screw *s*, and with the other the stop *E*; and in all cases where it can be done, the greater movements of the tap should be executed in this way, for the purpose of saving the apparatus. For the purpose, however, of effecting with one hand this greater movement of the tap, shutting or opening it entirely, the screw *I* is added. It is only so much screwed on that the friction of the plate *g* on the cylinder *b* is somewhat greater than the friction of the tap *B* in its cylinder; and therefore this latter is simultaneously moved when the wheel *e* is turned by the micrometer screw *C*. If the tap, however, be only turned on the stop and the micrometer screw, and therefore not protruded, the tap may also be turned at pleasure if the friction of the plate

*g* is only overcome. The plate *g* should fit loosely in the union *E*, that it may be pressed against the cylinder *b*, and easily recede when the screw *I* is lifted: it must, however, not fall off when the apparatus is taken away. Its brim is therefore on its convex surface of a conical form, and the receiving hole likewise made to assume a conical shape also; it is introduced from outside, a larger screw closing it at this point with a thread for the screw *I*.

This arrangement may be used for different taps if they are only provided with the cylinder *b*, the latter fitting exactly into the union *E*.

The oxygen gas is evolved from the apparatus containing the sulphuric acid into a tube from one foot and a half to two feet in length, half an inch in width, filled with pieces of caustic potassa, and bent in the shape of an U; and from this it is carried on to the tube of combustion. Those parts hitherto mentioned may remain thus arranged for a long time without the sulphuric acid or the potassa requiring to be renewed. We have conducted gas through the same substances for more than a hundred analyses.

[To be concluded in our next.]

ART. III—*On Opianic Acid, a new organic body obtained from Narcotine (opian)*. First notice by LIEBIG and WÖHLER (Gött. gel. Anzeigen, 138 Stück. 1842).

THIS body, which is remarkable on account of the manner in which it is formed, results from narcotine being exposed, under certain circumstances, to the effects of oxidation. It is best obtained in the following manner:—Narcotine is dissolved in dilute sulphuric acid, and it should be observed, that this latter may be present in considerable excess; to this solution manganese is added, being finely triturated, and then heated. The solution soon begins to assume a saffron-yellow colour, and evolves carbonic acid gas. The temperature is increased to the boiling point, and continued until no further carbonic acid gas is evolved. It should be ascertained that the manganese, as also the sulphuric acid, are present in excess at the termination of the process. The solution being still at a boiling temperature, is passed through a filter. Whilst cooling the liquid solidifies, forming a mass of fine crystalline needles. These consist of opianic acid. The mass is placed on a filter, where the yellow-coloured liquor is allowed to drip off the crystals, which are then repeatedly washed with cold water, and finally pressed as strongly as possible; after which the acid is purified by means of good animal charcoal, and repeatedly re-crystallizing from a saturated solution in boiling water.

Opianic acid crystallizes in very fine prisms of a silky lustre.

It dissolves scarcely at all in cold water, but more freely in hot water; thus a saturated solution, at the boiling point, almost entirely solidifies on cooling, resembling benzoic acid. It likewise dissolves in spirit of wine. It has an acid reaction, possessing, however, only a feebly acidulous bitter taste. It fuses easily into a clear oil, and solidifies into a crystalline form, but remains amorphous if heated beyond its point of fusion. It does not seem to be volatile, although it may be carried over by distillation; this may, however, be explained by the circumstance that it rises on the sides of the vessel. Heated in the open air, it gives out an aromatic odour resembling that of Narcotine. It is likewise very inflammable, and burns with a bright sooty flame.

Opianic acid disengages carbonic acid, and forms soluble salts with all bases. The salts of oxide of silver and lead crystallize in thin bright prisms and laminæ.

It does not contain any azote. The writers will, on a future occasion, treat in detail of its formation from Narcotine, and its remarkable behaviour towards ammonia.

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**ART. IV.—*Simple Quantitative Analysis of Carbonates, or the Application of Glass of Borax in Quantitative Analysis.***

By Count SCHAFFGOTSCH.

IN order to ascertain the quantity of carbonic acid in combinations, which may be decomposed by acids, they are commonly infused with a weighed quantity of dilute acid, whilst the escape of the hydrogen is prevented by a tube of chloride of calcium, and then the quantity of disengaged carbonic acid is ascertained by weighing, and calculating the loss. The method of Count Schaffgotsch consists in employing a non-volatile acid, which, while it serves to resist the influence of heat, is much easier in practice. Boracic and phosphoric acids are, however, unfit for this purpose, since, by repeated fusion, they continually lose in weight; the anhydrous biborate of soda, or glass of borax, answers all these demands, on the other hand, perfectly. It is absolutely fire-proof; and, being but slightly hygroscopic, its weight can be ascertained with great precision. Besides this, it easily decomposes the saline carbonates; and, as it fuses slowly and with difficulty, it does not cause any loss. The process is as follows:—

From two to seven grammes (30 to 100 grains) of pure, clear, glass of borax are fused in a large platina crucible over the spirit-lamp, with a double current of air, and exactly weighed after cooling. A quantity of the saline carbonate in question being previously weighed, is then put on the surface of the glass of borax, either in the form of a powder or in pieces, and this is

then fused, by carefully increasing the temperature, until, when about a quarter of an hour has elapsed, the whole flows as a clear glass. The quantity of carbonic acid is then ascertained from the loss indicated by weighing the crucible after it has cooled.—*Poggendorff's Annalen*, No. 10, 1842. ULEX.

ART. V.—*On the Evolution of Oxygen from the Organic Deposit of a Salt Spring.* By FR. WÖHLER.

AT the bottom of the salt basins of the salt works of Rodenberg, in Hessa, a glutinous mass is formed, of a greyish-yellow colour, and of a tough, skinny appearance, not unlike semi-decomposed animal membrane. Even after being washed it preserves an odour of fish or sea water. This substance is everywhere filled with large bubbles of air, sometimes of several inches in breadth, which are so tightly enclosed in the substance that they cannot escape therefrom of themselves, but ascend to the surface in great number as soon as the skinny substance is torn by means of a stick. The quantity of air thus enclosed is so considerable that hundreds of bottles might be filled with it. If a burning chip be brought into this air, it inflames, and burns with a bright flame. The air consists of 51 per cent. of oxygen gas, and 49 per cent. of azote. Wöhler is of opinion, that at first pure oxygen is evolved, which, however, like air in an animal bladder, is partly exchanged for atmospheric air.

It must be observed, that the salt water, when recently pumped out, contains such a quantity of sulphuretted hydrogen, that it might be taken for sulphuretted water: having, however, once passed through the thorn-walls, or filters, into the salt basins, it entirely loses its odour. It was ascertained, by microscopic observation, that the membranous mass consisted of living and moving infusoria,—species of *Navicula* and *Galionella* being interwoven with extremely delicate and colourless threads of *confervæ*. Since, according to the supposition of Ehrenberg, Priestleyan green matter is not a vegetable substance, but consists of real animalculæ, especially *Chlamidomonas Pubisculus*, and *Euglenæ viridis*, which likewise exhale 60 per cent. of oxygen, the evolution of the before-mentioned gas cannot be ascribed to the *confervæ* existing in the mass, but rather to the infusoria, and to these latter alone.—*Ibid.* ULEX.

ART. VI.—*On the Cupro-arsenical Test.* By REINSCH.

If arsenic is contained in any acid, as, for instance, in phosphoric, sulphuric, acetic acid, &c., and this be boiled with metallic copper, the latter remains perfectly bright: an aqueous solution of arsenious acid ( $\text{As}^3\text{O}_3$ ) likewise does not act on

copper readily; if, however, a few drops of concentrated muriatic acid are allowed to run over the surface of the sheet of copper, the liquid being still hot, the copper is instantly covered with the characteristic iron-gray film of arsenic. A solution, diluted to 100,000 times, was prepared from another solution of arsenious acid, diluted to 1000th; these were mixed with the utmost precision in equal parts of concentrated and perfectly pure muriatic acid and distilled water, and different test liquids made with the former until diluted to one-millionth of its contents. By diluting with 500,000 parts of water, containing therefore  $\frac{1}{1000000}$  of a grain of arsenic, the copper plate, after the liquid previously boiled had been allowed to stand for half an hour, was, for the greater part, covered with an extremely thin, but perceptible, film of arsenic. As a controlling experiment, a perfectly similar plate was treated with dilute muriatic acid alone; this remained, however, quite unchanged; but it must be observed, that in the case of the copper remaining for several hours in the liquor, under the influence of the atmosphere, it becomes covered with a black hue, perhaps an undissolved chloride of copper; this, however, can never cause misconception, since, if arsenic be really contained in the liquor, it is completely precipitated after the lapse of half an hour, during which space of time metallic copper preserves its lustre in the acid liquor. In masticated food, taken from the contents of the stomach and bowels, arsenic may be as easily detected; they have only to be digested with dilute muriatic acid, and treated with a plate of copper. In order to detect the arsenic by another process, the copper plate is rinsed with water, carefully dried over a flame, and then placed in a tube 15 inches long, and drawn out to a point at one extremity: a small bent tube, provided at the end with a pierced cork, is hermetically adapted thereto. The place where the copper plate lies is then heated by the spirit lamp, when the arsenious acid sublimes in small, but perceptibly glittering, crystals. If the point is then closed by fusion, the arsenious acid may be examined as such, and dissolved in muriatic acid, then tested with nitrate of silver and sulphuretted hydrogen, or in Marsh's apparatus. If it is intended to obtain metallic arsenic, and not arsenious acid, the small tube is brought into a hydrogen apparatus, and heated. The arsenic then deposits, in its metallic form, on any cold object.—*Sächsisches Gew. Bl.*

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ART. VII.—*Application of Marble in Analysis.* By Professor T. T. RUNGE.

GAY-LUSSAC has made use of marble in determining the strength of hydrochloric and nitric acids. As the marble may be em-

played in pieces for this purpose, without any increase of temperature, this mode of operating is of great practical utility. Its value is, however, still farther enhanced by the extension of which it is capable. Thus, if a certain quantity of carbonate of potassa, whose power of dissolving marble is known, be dissolved in a certain quantity of acid, a smaller portion of marble will of course be dissolved than in the unmixed acid; and this decrease of solubility is the measure of the potassa contained in the salt. The same is the case with soda, ammonia, lime, and barytes. All metals whose combinations with chlorine and nitric acid cannot be separated by marble without the application of heat,—*e. g.* chloride of zinc, chloride of cadmium, sesquichloride of chromium, chloride of manganese, &c. as well as nitrate of lead,—may be determined in the same manner. This method is, therefore, particularly valuable, because the combinations of chalk, barytes, zinc, cadmium, &c. with carbonic acid, after having been well washed, may be placed, while still moist, together with the filter, in the test acid. The piece of marble, which must be accurately weighed, is not put in before the precipitate to be examined has been completely dissolved, and not taken out again till it has entirely ceased to be acted on; and, towards the end of the process, the application of a gentle heat is in general admissible. The quantity of oxide, or metal, contained in the precipitate dissolved by the test acid, is now calculated by the decrease in the loss of weight which the marble has sustained. Pure zinc may supply the place of marble in cases where difficultly soluble salts of lime would be formed. Thus, it is applicable in determining the strength of dilute sulphuric acid, and the excess of acid in the bisulphates. But here, by means of chloride of barium, we may use hydrochloric in lieu of sulphuric acid, and marble may be likewise employed. Since marble crumbles into a granular powder in acetic acid, the strength of that acid cannot be determined by it, and the acid itself is incapable of being applied as a test. But this does not apply to nitric acid; and the latter, especially in cases where the oxide dissolves with difficulty in hydrochloric acid, is to be preferred; *e. g.* in the case of oxide of lead.—*Arch. d Pharm.* Oct. 1842.

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#### ART. VIII.—*Convenient Test for Chloride of Lime.*

THE properties indicated by copper when acted on by sesquichloride of iron dissolved in hydrochloric acid, as stated by Fuch, may be applied as a test for chloride of lime.

An accurately weighed quantity of chloride of lime is infused with water, and a solution of recently prepared simple chloride of iron then added in excess. No chlorine is evolved during this operation; but a quantity of oxide of iron forms, exactly cor-

responding to the contents of chlorine: hydrochloric acid is then added in excess, a weighed piece of copper put into it, and the liquor boiled until its dark colour changes into a pale yellowish-green, without further alteration. The copper is then washed, dried, and weighed, and the quantity of chlorine calculated from the loss of weight,—64 of copper indicating 35.4 of chlorine. Such an experiment is executed in from one to two hours, and is best undertaken in a small retort, heated in a sand-bath, with the neck arranged perpendicularly.—*Arch. d. Pharm.* Oct. 1842.

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## CHYMISTRY APPLIED TO AGRICULTURE.

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### ART. IX.—*Analysis of Soils.*

THE analysis of soils is often of great importance to the agriculturist, and in this particular he has frequently to address himself to the chymist. The instructions for undertaking such analyses differ materially from each other. Of themselves they are very simple and easily executed, if a certain plan has been previously laid down for attaining the object in view. This object is two-fold—viz. 1stly, To know how much and what substances of organic origin, (that is to say, how much humus) is contained in the soil: and, 2dly, With what disintegrated minerals the inorganic part of the soil is mixed.

The answer to the first question falls entirely within the compass of organic analysis. The soil is dried in an oil-bath at 266° F.; then treated—in the apparatus figured p. 281 of the *ANNALS*—first with ether, then with alcohol, water, and so on consecutively. By this process several different matters are extracted from the soil; but it is very uncertain if any of them will be distinguished as previously already known. We have not yet sufficiently examined the products of the decomposition of organic bodies, to be able to execute this kind of analysis in such a manner that we can finally decide what products of decomposition the soil contains. This examination, therefore, becomes difficult, and yields, even if executed with precision, not very valuable results, until we shall have previously made ourselves acquainted with these products of decomposition by a close examination of them.

Two circumstances respecting humus may be positively ascertained, viz. 1stly, Its quantity; which is found out by burning a weighed quantity of soil, after being dried at 266° F., in an open crucible, until all the combustible parts are destroyed, when the loss shows the contents of organic matter: and, 2dly, The azote therein contained; which is ascertained by combustion, according to the method of Varrentrapp and Will. The results of



these experiments are seldom of much value; since the quality of the humus in soils varies according to the manure added, and as the succeeding crops may absorb the several components each manure.

The inorganic components of the soil, again, are easily ascertained. An air-dried sample of the soil being disintegrated as much as possible between the hands, is weighed, and sifted through a tinplate sieve, consisting of several plates succeeding each other, with less and lesser holes. The sieve is then shaken, with the cover on, until the mass is divided according to the different size of the holes in the different compartments of the sieve, and each of these quantities is then weighed, in order to give an idea of the different sizes of the various ingredients.

Another air-dried sample is likewise weighed, and then dried in the water-bath, until it ceases to lose weight. A smaller portion of it is then weighed, placed in a glass tube, which has been closed at one extremity by fusion, and heated in the oil-bath to 266° F. until it ceases to lose weight, after which the contents of water are found by calculation. This sample is heated to redness in an open crucible until the whole of the carbon is consumed, and the organic matter of the whole is found by a calculation based thereon.

The greater portion of the sample is likewise exactly weighed, put into a glass vessel, infused in water, and then stirred with a quill. After being left undisturbed for a few moments, all the lighter parts are skimmed off, and the turbid water poured through a muslin sieve into another vessel, where it is allowed to stand for the purpose of depositing. There remain on the sieve fibres of roots, undecomposed portions of straw, stalks, &c. This operation is repeated until the freshly added water no longer becomes turbid by stirring. The finally remaining residue is dried and weighed, but not exposed to a red heat.

This residue is spread on paper, and, if required, examined with the aid of a compound microscope, in case of the parts being very small. The practised eye then detects the grains of those minerals, the *debris* of which form the soil. Grains of transparent quartz, milk-quartz, red and white field-spar, scales of mica, lime, clay-slate, &c. are thus detected, and have been obtained from such minerals as are met with in the neighbourhood; and this easy examination is sufficient to elucidate of what minerals the soil is composed—on which point chymical analysis would not be able to give positive information. In proportion to the more finely pulverized portions contained in soil from the recent formations of mountains, the greater is its fertility, if mixed with the requisite manure. The *debris* of limestones, and different tertiary kinds of aluminous slate, mixed to a certain extent with quartzose or granitic sand, form the best mixtures.

From this residue the carbonate of lime (in case of the same being contained therein) is extracted by a mixture of one part of nitric acid and 100 parts of water, which are allowed to act on it without heat. When the effervescence has ceased, although the liquor still reddens litmus paper, the liquid is decanted, and the calcareous earth, after being neutralized with caustic ammonia, is precipitated therefrom by oxalate of ammonia. The magnesian earth is then ascertained (if present) by mixing the liquor in excess with carbonate of potassa, and boiling it therewith.

The residue left undissolved by nitric acid is washed, dried, weighed, and treated with concentrated muriatic acid. This solution is then further treated in the way directed for analyzing silicates which are soluble in muriatic acid. The muriatic acid frequently disengages siliceous acid without dissolving it. These are then extracted by boiling the undissolved parts with a ley of carbonate of soda. The undissolved residue is then weighed. It is in general nothing but sand composed of quartz or granite.

We now return to the parts left after being skimmed. That portion which passed through the muslin sieve is a mixture of decomposed organic substances (humus), clay (alumina), and extremely fine sand, which frequently contains siliceous shells from infusoria. After being left undisturbed for an hour, the sand and humus have settled; the clay, however, still remains suspended. The water is then decanted from the thick pap of clay, and gradually evaporated to dryness in a weighed basin or a crucible, after which the remaining clay is dried by the application of a rather high degree of heat, *e. g.*, in the oil-bath at 302° F., and weighed.

The deposited mass beneath the pap of clay is placed on a filter previously weighed. The turbid water which passed during the washing of the mass through the filter, together with the clay solution, is exposed to evaporation. The filter, together with all therein contained, is dried at 212° F., weighed, and burnt to ashes; after which the residue is examined under the microscope. It is then further treated in the same way as above stated for the coarser powder.—*Berz. Lehr. d. Chemie*, vol. x. § 123.

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## PRACTICAL PHARMACY.

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### ART. X.—*Formulae for Coloured Lights.*

*To the Editors of the Annals of Chymistry and Pharmacy.*

GENTLEMEN,—As I expect largely to participate in the advantages derivable from the valuable information received through your useful

journal, I send you, as under, processes for the manufacture of various "Coloured Fires," as desired by your correspondent in No. 4, p. 128.—  
I am, gentlemen, yours respectfully,

Phillip Street, Birmingham, Nov. 12, 1842.

ALFRED BIRD.

**RED FIRE.**—Strontian Nitrat. *exsiccat.* ʒxx.; Sulphur Sublim. ʒviss.; Antimon. Sulphuret. Nig. ʒij.; Potass. Chlorat. ʒiiss.; Pulv. Carbon. Liq. Recent. ʒiv.

**PROCESS.**—Fuse the strontian in an iron pot, or a Hessian crucible, till it falls into a white powder;—(it will take about twenty-six ounces of crystals to produce twenty ounces of powder);—mix that with the antimony, sulphur, and carbon, and sift them. 2nd, Powder the oxymur. potassæ very fine (BY ITSELF, and STIR IT INTO THE MIXED POWDER): Lastly, Sift the whole through once or twice, till thoroughly blended. Should it not burn well, add small quantities of carbon, say ʒss. at a time.

**GREEN FIRE.**—Nitrat. Barytæ, ʒxx.; Sulph. Sublim. ʒiss.; Antim. Sulph. Nig. ʒss.; Potass. Chlorat. ʒi. ʒij.; Pulv. Carbon. Lig. ʒij.

**PROCESS.**—As the barytes contains no water of crystallization it will not require drying. It should be finely powdered, and mixed, through a sieve, with the antimony, sulphur, and charcoal, as directed for the Red Fire. The chlorate of potass is lastly to be added, and the whole repeatedly sifted till well mixed: its combustibility may be increased by adding small quantities of the charcoal till it burns well.

**WHITE FIRE.**—Antimon. Sulph. Nig. ʒiv.; Nitratiss Potassæ ʒxii.; Sulphur Sublim. ʒxvj.; Carbon. Lig. Pulv. ʒij.; Arsenic. Oxyd. ʒij.

**PROCESS.**—Mix the whole, finely powdered, through a sieve; and, if necessary, add charcoal till it burns well.

**BLUE FIRE.**—A blue tint may be given to the above by adding Orpiment instead of Arsenic Oxyd. I am not aware of any form for producing a decidedly blue colour; probably a Salt of Cobalt might do so.

#### ART. XI.—*Linseed Meal.*

Dr. SERRURIER states, that he has observed, when rancid and impure linseed meal has been applied in the form of cataplasm to the eyes, ophthalmia has been the result. Dr. Guillon observes, that he also has sometimes observed erysipelatous inflammation arising from the acrid rancid oil which is often contained in the impure linseed cake.—*Journ. de Chimie Med.*

#### ART. XII.—“*Our Pharmacopœia.*”

**ACIDUM ACETICUM.**—The proportions of crystallized acetate of soda and sulphuric acid, directed by the Pharmacopœia, are very proper. As regards distillation, it is ordered to be executed from a glass retort: it is advisable, however, to select an alembic with a short neck, and to adapt a glass head thereto. The advantages yielded by such an arrangement are, 1st, The alembic may be filled with less trouble, since there is no risk, in such an arrangement, of the neck being contaminated with portions of the substances introduced by their adhering to its sides, as sometimes occurs when a retort is used; and, 2dly, In consequence of the greater security of the process of distillation, during which contamination of the distilled liquor might be apprehended, by the spirting of the ingredients, and the rising of the boiling liquor over the brim of the vessel, is more effectually avoided.

The water being weighed is first put into the alembic ; a circulating motion is caused therein by stirring with a glass rod ; the sulphuric acid is then poured into it in a thin stream. After the hot mixture has cooled, the acetate of soda is added, the fire put on, and luted with a paste, consisting of equal parts of linseed meal and rye flour. The cucurbit or alembic is then placed in an iron-pot, on the bottom of which is spread a layer of sand about half a finger in height, and then surrounded with sand until the neck itself is covered. By means of a strip of Indian rubber, a somewhat bent glass-tube is then adapted to the beak of the head, and this is introduced into a large bottle or matrass. The distillation is then carried on until the fumes have ceased to condense in the head.

The acetic acid thus obtained is generally free from sulphuric acid and sulphate of soda. If, however, it should be contaminated by either one or the other, (which may be easily detected by diluting with water, and adding chloride of barium,) it must be rectified over some acetate of soda.

By preparing the acidum aceticum according to the method indicated, care must be taken that the acetate of soda be perfectly pure. If it contains common salt (the constant accompaniment of calcined soda, from which carbonate of soda is sometimes obtained, the acetate of soda being procured by saturating this salt with vinegar) the distilled liquor is always contaminated with muriatic acid, which is then removed by rectification in the manner indicated.

The tests for the acetic acid thus obtained are not fully stated in Phillips's translation of the Pharm. Lond., since the contamination with sulphurous acid is not mentioned. This impurity may be discovered by sulphuretted hydrogen gas, which produces a yellow precipitate of sulphur,  $\text{SO}_2 + 2 \text{SH} = 3 \text{S} + 2 \text{HO}$  : or by adding a solution of chloride of barium, and then a solution of chlorine. If sulphurous acid is decomposed by the chlorine, it combines with its hydrogen to hydrochloric acid, and yields oxygen to the sulphurous acid, which is thereby converted into sulphuric acid, and is precipitated as sulphate of barytes. Rectification over manganese [ $\text{Mn O}_2$ ], which yields one atom of oxygen, converts  $\text{SO}_2$  into  $\text{SO}_3$ , and remedies this impurity. In Germany, an acetum concentratum is usually kept as well as the acidum aceticum, which is commonly half the strength of the former. It is generally obtained by distillation of sugar of lead with sulphuric acid. ULEX.

[On the large scale, acetic acid is distilled from shallow copper vessels, formed without rivets or solder on that part which is in immediate contact with the ingredients ; a coil of copper pipe (drawn, but not soldered) traverses the bottom of the apparatus,

and is heated by steam, having a pressure of about 30 lbs. to the inch; where the pipe enters the distilling vessel it is necessary to solder the same to the still with what is technically termed silver solder. The charges require from four to six hours to work off. The source whence we obtain acetic acid is from America, Sweden, and Norway, being imported in the form of acetate of lime; this is purchased by the chymist, who converts it into a very pure acetate of soda, which product is then sent to the acetic acid distiller, who obtains, by the addition of sulphuric acid, the distilled product, acetic acid, and a residue consisting of sulphate of soda and some undecomposed acetate of the same base. This residue is returned to the chymist who purifies acetate of lime, and then the sulphate of soda residue serves to decompose the latter salt. Such is a brief outline of the economy of this manufacture as practised in England, and explains the fact, that in large quantities (say by contracting for 100 carboys), a very pure acetic acid, sp. gr. 1.50, may be procured for sixpence per lb.

In some remarks on the Edinburgh Pharmacopœia, Mr. R. Phillips has made certain statements which appear to us inconsistent in themselves, and at variance with the facts of the case. To all who are aware of the great difficulty of accurately criticising details with which an acquaintance is obtained merely by experiments performed amidst many engagements, no apology from us is required for Mr. Phillips, whose talent and high position, as a scientific chymist, are acknowledged on all hands, however we may require such apology for ourselves. The passages to which we would particularly direct attention, appear in the *Medical Gazette*, No. 45, p. 689. They are as follows:—

That it is stated in the Edinburgh Pharmacopœia, that the density of acetic acid is to be 1068.5, and its saturating power 216, *when in fact it (such acid) is below 150.*

To prove that it is below 150, Mr. Phillips states (p. 688) that he

“Prepared a quantity of acetic acid, of density 1068.5, by *diluting* some glacial acid, with which he had been favoured by Mr. Morson.”

Now, at p. 271 of the same work, Mr. Phillips has stated—

“The College evidently intend to procure glacial, or the *strongest*, acetic acid.”

How, then, could Mr. Phillips expect to obtain the results anticipated, from the preparation directed by the College, if he *dilutes* a glacial acetic acid, with which he has been favoured by Mr. Morson, whilst the College evidently intend to procure undiluted glacial, or the *strongest*, acetic acid? Had the sp. gr. of such glacial acetic acid thus obtained been given, it would have been found, we think, close upon the gravity indicated by the Edinburgh College. Our grounds for this supposition are as follow:—We procured some commercial glacial

acid, sp. gr. 1065·3 at 49° F., from 1000 fluid grains thereof, we removed 213 grains, = 20 per cent., or one-fifth, and replenished the bottle with distilled water, temperature 44° F.;\* when mixed the temperature of the liquid was 46°·5 F., and the sp. gr. indicated was 1072·7, having required 220·4 grains of distilled water to replace the space occupied by 213 grains of the glacial acetic acid. From this diluted acid we removed 100 grains, equivalent to 79·5, of the glacial acid first employed, and replenished the thousand-grain bottle with distilled water, which now indicated 1069·3; having required, therefore, for this purpose, 97 grains. In a further experiment we removed 9 grains of the last acid, sp. gr. 1069·3, and replenished the thousand-grain bottle with distilled water; on weighing, the sp. gr. was 1068·5, indicating a quantity of distilled water, = 8·5 grains, as having been required for this purpose.

The inconsistency appears to us as arising from a comparison of the acknowledgment, that the Edinburgh College evidently intend to procure a glacial acetic acid, whilst Mr. P. *dilutes* a glacial acetic acid, in order to obtain the gravity given by the College; the inaccuracy, as to facts, appears in the statement, that acetic acid, sp. gr. 1068·5 (evidently intended to be the glacial), is in fact below 150; that is, that 100 minims of such acid will not saturate 150 grains of crystallized carbonate of soda; and also, that when the acid referred to by the College (always meaning the glacial) is diluted with 20 per cent. of water, Mr. P. states its density *is diminished*. Now our experiments prove, that when 1000 fluid grains of glacial acetic acid, of sp. gr. 1065·3 at 49° F., have 213 grains removed therefrom, and the bottle refilled with distilled water, temperature 44° F., that the density of the mixture is *increased* to 1072·7, the temperature being 46°·5 F.—En.]

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ART. XIII.—*On Phenyl, and the Combinations therefrom derived.* By A. LAURENT.

SOME years ago I presented to the French Academy a treatise, in which I described, under the name of Chlorophenesine and Chlorephenisic acid, two compounds, which are obtained by introducing chlorine into the oil obtained from coal gas. I long entertained a wish to return to the investigation of the same subject, and proposed to myself the satisfactory resolution of the following questions:—

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\* On mixing the distilled water with the acetic acid in this case, small bubbles were slowly disengaged, whence we might hazard the supposition, that the increased density of acetic acid, when reduced from its glacial state, is owing to the fact that the liquid particles of the mixture then come into such a close state of aggregation as not to admit of the usual quantity of atmospheric air which is contained in either, or both of them, when separate.

1. Since tar, treated with chlorine and distilled, then treated with sulphuric acid, and afterwards with chlorine and ammonia, furnishes chlorophenisic acid, might not a chloride have been produced during these complicated proceedings, which was afterwards changed, by the action of ammonia, into an acid containing oxygen?

What is the effect produced by distillation and treatment with sulphuric acid? Which of the components of tar furnishes the chlorophenisic acid?

2. Coal tar yields, with nitric acid, a bitter acid, and a new combination, both of which, as well as the chlorophenisic acid, contain 12 atoms of carbon. Have not these three bodies a common origin?

In order to furnish a solution of these questions, I submitted 50 litres (= 11 Gns. imp.) of tar to the following treatment:—I first distilled it in a copper vessel. In the course of this operation, first some carburetted hydrogen passed over, then naphthalene, and, lastly, anthracene and chrysine.

As soon as the anthracene began to pass over, distillation was interrupted. The product was re-distilled, and received in three different portions; the first of which boiled at from 100 to 150°, = 212 to 302° F.; the second at from 150 to 200°, = 302 to 392° F.; the third consisted chiefly of naphthalene.

The same experiment was repeated with each portion. I treated them first with chlorine, then with sulphuric acid; and, re-distilled again, passed chlorine through them, and added ammonia thereto. The second portion only (boiling at from 150 to 200°) yielded chlorophenisate of ammonia. I submitted them, lastly, to the same operation as before; omitting, however, in each succeeding experiment, first, the sulphuric acid, then the distillation, and lastly the ammonia. By a sufficiently prolonged action of the chlorine on the oil, whose boiling point varied from 150 to 200°, I finally obtained crystallized chlorophenisic acid.

In endeavouring to isolate, by distillation, the substance from which this acid is immediately produced, I obtained a certain quantity of oils, whose boiling point differed from about 8 to 10° F.; which, however, by a second distillation, separated again into more or less volatile oils, and behaved towards chlorine nearly similar.

By agitating these oils with sulphuric acid two layers were formed; one nearly colourless, light, and consisting of unchanged oil, and another, brown, thick, containing the sulphuric acid. The oil treated with chlorine, furnished little or no chlorophenisic acid.

The substance, therefore, from which this acid was produced was combined with the sulphuric acid. By addition of water to the latter, a brown, thick matter, for the greater part soluble in

ammonia, was disengaged, which, in combination with the water, assumes, especially when exposed to the air, a blue colour. This colour disappears again after long exposure to the open air, in consequence of the evaporation of the ammonia.

As I obtained no satisfactory result from this substance by the action of chlorine, I neutralized the sulphuric acid solution with chalk, filtered the gypsum, and then obtained, by evaporation, a sufficiently considerable mass of saline matter, coloured blue by some foreign matter, and consisting of a mixture of two salts, from which I was not able to separate the sought-for substance.

Supposing that the chlorophenisis acid, which contains one atom of water, might be created from, perhaps, an aqueous acid substance combined with peculiar matter, I mixed the oil (whose boiling point averages from 150 to 200°, = 302 to 392° F.) with a hot saturated solution of potassa, and added at the same time pulverized potassa. The oil instantly solidified to a white, adhesive, crystalline mass, and evolved an exceedingly powerful disagreeable odour.

[To be continued.]

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ART. XIV.—*On the fine Division of Calomel.* By LEROY.

It is known that there are three forms of powdered calomel, which are understood as not possessing precisely similar properties. This difference has been explained by their different state of cohesion, which exerts an influence on their medical properties. These forms are, the calomel prepared in the *moist way*, by *steam*, and by *sublimation*.

The last is in most general use: it does not always possess, however, the same medical properties, nor, indeed, does it appear to have the same physical properties in the various drug-houses. It is met with of a yellowish-white, and even of a yellow colour; and this latter especially is a certain indication that the calomel has not been cleaned by elutriation, but simply by rubbing in the mortar without washing. The fineness of the powder is likewise very different.

Respecting elutriation, it is not always performed; and it is sometimes thought that this operation is not necessary for the small quantity of calomel which is in general used as a dose. It is considered sufficient simply to pound it finely in the mortar.

This mode of pulverising calomel, however, is not to be recommended in all cases. It may yield a powder of different degrees of fineness, according to the greater or less care with which the washing has been executed, which must likewise influence the medicinal effects of the product. I think that it would be proper to fix the time of decantation, if it is sought always to secure a precisely invariable fine powder.



The inconveniences connected with the common way of levigating are known. I think the following means may be adopted with success as rendering the operation less complicated, and furnishing a preparation of always the same degree of fineness, and, therefore, also of invariably similar effects, which must be the aim of the conscientious chymist. I have employed this method successfully for twelve years.

The calomel is first ground in a large mortar of glass, porcelain, or wedgewood ware, with a pestle of the same substance, and without the addition of water; then with the addition of warm water, which is poured off, and renewed, until it is ascertained, by caustic potassa and sulphuretted hydrogen, that no chloride of quicksilver is contained therein: the grinding of the calomel, with water of the ordinary temperature, is then continued in such a manner that it always stands one inch deep over the calomel, in order that the latter, which otherwise adheres to the sides, may be always brought under the pestle. When a sufficient quantity of fine powder has formed, the mortar is filled with water, to 7 or 8 inches high, the powder stirred therein, then allowed to settle for *two seconds*, and after this decanted on a filter arranged beforehand. The grinding and decanting is thus continued in the same way until the whole of the calomel is procured in a fine powder.

This proceeding is, as must be acknowledged, so easy and simple, that it can be executed anywhere, and it is free from all the inconveniences combined with the common way of preparation. If the operation is executed with care, the powder is of the same whiteness as calomel prepared by steam.—*Archiv. d. Pharm.*

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ART. XV.—*The Cause of different Liquid Extracts (Mellagines), Concentrated Decoctions, &c. becoming Turbid.* By Dr. DU MENIL.

It occurred to me, when I concentrated a decoction of the root of knotgrass and of taraxacum, as also of some other herbs, that the clear mellago was, after some time, solidified; and no longer liquid; and further, that their former brightness almost entirely returned by heating, so that this phenomenon must be produced by a salt which is more soluble at a high than at a low temperature. In order to examine this salt separately, I diluted the mellago with equal parts of cold water, let it settle, and separated the sediment by means of a thick and previously moistened flannel. What passed through was fit for use after compression; it grew turbid, nevertheless, after some time, but only slightly so. On the strainer there remained a crystalline mass resembling sand, which, after carefully washing in cold

water, was obtained white by treatment with hot water and repeated recrystallization. This being heated in a platina crucible, evolved an unpleasant empyreumatic smell, and left behind, after incineration, a mixture of phosphate and carbonate of lime. On a further examination, it was found to consist of phosphate, malate, and some humate of lime.

There is reason to believe that many extracts which yield a turbid solution contain the above salts. Should the presence of these be manifest from the phenomenon alluded to, it can only be prevented in the manner indicated above.—*Arch. d. Pharm.*

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ART. XVI.—*On the Carbonates of Protoxide of Iron.* By Dr. PLEISCHL.

I CONSIDER the pill-mass of carbonate of protoxide of iron, according to the prescription last given by Brandes, as very excellent, and it must be deemed an exceedingly valuable preparation. When I became acquainted with it through the "*Archives*," I had it instantly prepared, and have kept it by me for six months. From time to time I have examined it, and I see that it remains in excellent condition. I have not met with a milder preparation of iron, and I think it would not inconvenience the palates of women and children, however delicate.

*Archiv. d. Pharm.*

[We will give this formula in an early number.—ED.]

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ART. XVII.—*Adulteration of Potash.*

IN France an inferior potash is prepared in the following way :—Carbonate of soda or potassa, and sulphate of copper, are strongly heated in cast-iron pots. The copper serves merely for the purpose of imparting to the product the colour and appearance of Dantzic potash. Others calcine lime and sea salt for the same purpose; the adulterator's object being to sell a saline mass containing caustic potassa in excess.—*Vogel's Notizen, (from the Journ. de Pharm.)*

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ART. XVIII.—*On Fremy's Ferric Acid.* By Dr. BLEY.

TROMMSDORFF, at Erfurt, obtained the ferrate of potassa, discovered by Fremy, in the following way :—

He mixed two drachms of very finely pulverised iron-filings with four drachms of pulverised nitrate of potassa, and placed this mixture immediately in a crucible, of from 8 to 10 ounces in contents, heated glowing dark red, keeping the crucible standing on red-hot coals. As soon as combination takes place on one side of the mass by explosion, and with strong evolution of light, and

expulsion of white fumes, the crucible is removed from the fire. The deflagration then quickly spreads over the whole mass, which is removed from the crucible, so soon as this effect has ceased, into a cold plate, by means of an iron spatula. The dark-reddish-black mass (ferrate of potassa) dissolves with a beautiful cherry-red colour in water. The oxygen is, however, so slightly retained in combination with the acid, that the whole of the iron is precipitated from the filtered dark red liquor when exposed to the air, and without increasing the temperature, in the form of oxide, requiring scarcely half an hour to subside, and the supernatant liquid then appears colourless. The same occurs by exposing the dry combination to the air, and likewise if the heat employed for the deflagration is only urged very little beyond what was absolutely required.

It appears particularly remarkable that this degree of oxidation of iron, which is distinguished by the phenomenon of a very striking colour, has not attracted earlier attention. This acid may, however, sometimes induce experimenters to presume an admixture of manganese. According to Fremy, the iron should be put first into the crucible, and the saltpetre added as soon as the former grows red-hot. Trommsdorff, however, did not succeed so well in preparing the ferrate in this way as by that just described.

I have repeated this interesting experiment, and convinced myself how easily it succeeds according to the directions given by Trommsdorff.—*Arch. d. Pharm.*

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#### ART. XIX.—*Sale of Cocculus Indicus.*

*To the Editors of the Annals of Chymistry and Pharmacy.*

GENTLEMEN,—As you have given an article, a few numbers back of your excellent journal, on the Sale of Poisons, perhaps you will not object to inform your readers what you know about the extent of the sale of *Cocculus Indicus*; a drug said to be much employed in this metropolis, but I am not aware that it enters into any medical composition, or that it is useful in any of the arts of life. It is allowed to be a poisonous vegetable production, and the evidence of this rests on high scientific testimony, as we learn from the best works on Toxicology. I suspect it is largely employed in adulterating malt liquor, and that the public health is materially injured by it. It acts strongly on the brain and spinal marrow, and will produce stupor, convulsions, and all the sad train of effects arising from a disturbance in the functions of the nervous system.

Now, we hear much of the cases of accidental poisoning, but the systematic wholesale poisoning is comparatively unheeded. It is to be deplored that the article, and its extract, find a place in our Tariff, thereby introduced into the country under the sanction of government.

I am, gentlemen, your obedient servant,

London, Oct. 24, 1842.

MEDICUS.

[We have applied at the Customs, to ascertain the quantity of this poison annually imported in the regular way, *i. e.* unsmuggled; but no distinct register thereof has been kept. This fact should speak volumes.—ED. A. C.]

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#### ART. XX.—*Camphor Cake for Chapped Hands.*

*To the Editors of the Annals of Chymistry and Pharmacy.*

R. White soap, 1 lb. ; spermaceti, 1 oz. ; melt and add powdered camphor, 1 oz. ; mix, *s. a.* (In answer to *Oreos*).

Chelsea, Nov. 19, 1842.

W. BARLETT.

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### GALVANISM AND ELECTRICITY.

#### ART. XXI.—*On Galvanography.* By JACOBI.

[From a Report to the Academy of Sciences at St. Petersburg, *Bullet. Scientif. x.* No. 6.]

THE Academy will remember the first highly satisfactory specimens of Galvanography which I had the honour to place before its members, at the meeting held August the 17th, 1840, in the name of his Imperial Highness the Duke of Leuchtenberg. His Imperial Highness had executed drawings of different kinds, partly on polished copper, and partly on copper-plates plated with silver, and had employed for that purpose a solution of Damar resin in oil of turpentine. A galvano-plastic copy of these plates at once furnished an engraving ready for working off the original drawing. This beautiful and important application of galvano-plastics opened a new and wide field to the graphic art; for, indeed, a quite peculiar art was thus given birth to, respecting which his Imperial Highness expressed himself afterwards, in a letter addressed to myself, in the following terms:—

“Manifold experiments have proved to me, that, very shortly, by this process a peculiar artistical effect may be obtained, which differs much from engravings and wood-cuts. It resembles mostly the English method of drawing with Indian ink—it is even quite equal to this art. In all these experiments I found it, indeed, the best plan to execute the drawings on the metallic plate after the manner of drawing with Indian ink. I exe-

cuted, however, several of these drawings merely with lines, and the impression was then, indeed, not behind even the best wood-cuts."

Instead of the Damara resin, his Imperial Highness afterwards employed the common English lac, which was spread over the polished metal plates, without any preparation, by means of a pen. The writings and drawings now before the meeting, executed in a hasty manner, have been thus produced; they prove that even the finest lines may be faithfully rendered.

Besides the artistic and technical interest of galvanography, it was the physical phenomenon accompanying the operation which in no less degree attracted the attention of his Imperial Highness; and which is, that surfaces not being conductors, gradually, and with the most perfect regularity, assume a coating of copper. The phenomenon, and the manner in which it is produced, are, indeed, not so easily explained as might appear at the first glance, since a gradual *growing* of the copper over the non-conducting parts in relief from beneath cannot possibly be received as the cause of this phenomenon. His Imperial Highness was led, by observations made in the course of his experiments, to the following explanatory remarks:—

It is not at all necessary to coat the non-conducting drawing with a conducting cover or metallic dust, since the galvanic precipitation proceeded admirably without this coating, the bright plate being quickly covered in the first 24, 48, or 72 hours, increasing in thickness, and in proportion as this thickness exceeded the level of the different parts in relief, the precipitation likewise took place in them in succession. There occurred in the formation of my galvanographic plates three epochs, very distinctly separated from each other.

The first was the simultaneous covering of all the conducting parts of the bright metal plate—*interstitial precipitation*: the second epoch consisted in the deposition of the succeeding coat over the nonconducting drawing, during which process the parts lowest in relief were first covered, the highest last. During the third epoch the increase went on simultaneously and uniformly over all parts, as the galvanic current met everywhere with metallic points only—*simultaneous precipitation*.

The galvanographic plates prove, indeed, a remarkable formation, and differ from the common galvano-plastic casts. In the case of these latter, where the original consists of metallic or conductive surfaces, the elevations and depressions corresponding with the original are observed even when of a considerable thickness on the back, thus forming the counterpart of the front sides. The galvanographic plates which I have the honour of placing before the section, have this peculiarity, that

the lineaments of the front side appear, on the contrary, at the back, but in the same order, and therefore inverse to the original drawing. The elevations of the ink drawing produce corresponding depressions not only on the front side, but likewise on the back of the galvano-plastic copies.

I place before the Academy another interesting experiment, which his Imperial Highness undertook, in the course of the last summer, at *Zarskoe-Selo*. Instead of employing the bright metal plate, bearing the drawing or writing, as the Cathode, his Imperial Highness brought it in contact with the copper pole of the battery, thus making it the Anode. The whole of the plate was thus etched by galvanism, and those parts only which had been covered with lines were preserved; thus forming a raised drawing, which could be worked off in the printing press, like woodcuts. By this operation another process of galvanography is furnished, which seems not less susceptible of further perfection, and which might answer for certain purposes, as an intermediate means. It need scarcely be added, that it is indifferent to the galvanic force whether it exerts its power on a hasty drawing, or on master-pieces of the Arts, or Calligraphy, such is its peculiar advantage. I have further to observe, that his Imperial Highness added the date of the year (1841) on the latter plate, when the process had continued only for two days, and when the surface had assumed a watered *moirée*-like appearance. The process was then only continued for a few hours longer.

[To be continued.]

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## OBITUARY.

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GERMAN newspapers inform us of the death of the well-known chymist, RUDOLPH BRANDES, the founder and director of the Pharmaceutical Society of Northern Germany, and editor of several journals of chymistry and pharmacy. He died very suddenly, on the 3d of this month, at Salruffeln, in consequence of inflammation of the brain, at the early age of 48 years. His loss will not only be lamented in Germany, but in every country where his great exertions for promoting science are known, and still more by those to whom he was personally known.

[This eminent chymist has obtained a renown in England which will cause the announcement of the termination of his earthly career to be deeply felt by the promoters of science. Rich although Germany be in talented chymists, sincere regret will be experienced at the loss of Brandes: we freely sympathize with her sons in the death of one whose labours have imparted such store of instruction to ourselves.]

| NOMINA.                              | FORMULÆ.                                   |
|--------------------------------------|--------------------------------------------|
| <i>bi Boras Platinosus</i> . . . . . | Pt $\ddot{B}^{\circ}$ . . . . .            |
| <i>Boras Plumbicus</i> . . . . .     | Pb $\ddot{B}$ . . . . .                    |
| <i>bi Boras Plumbicus</i> . . . . .  | Pb $\ddot{B}^{\circ}$ . . . . .            |
| <i>Boras Rhodicus</i> . . . . .      | R $_{\circ}$ $\ddot{B}^{\circ}$ . . . . .  |
| <i>bi Boras Rhodicus</i> . . . . .   | R $_{\circ}$ $\ddot{B}^{\circ}$ . . . . .  |
| <i>Boras Stannicus</i> . . . . .     | Šn $\ddot{B}^{\circ}$ . . . . .            |
| <i>bi Boras Stannicus</i> . . . . .  | Šn $\ddot{B}^{\circ}$ . . . . .            |
| <i>Boras Stannosus</i> . . . . .     | Šn $\ddot{B}$ . . . . .                    |
| <i>bi Boras Stannosus</i> . . . . .  | Šn $\ddot{B}^{\circ}$ . . . . .            |
| <i>Boras Stibicus</i> . . . . .      | Šb $_{\circ}$ $\ddot{B}^{\circ}$ . . . . . |
| <i>bi Boras Stibicus</i> . . . . .   | Šb $_{\circ}$ $\ddot{B}^{\circ}$ . . . . . |
| <i>Boras Stronticus</i> . . . . .    | Šr $\ddot{B}$ . . . . .                    |
| <i>bi Boras Stronticus</i> . . . . . | Šr $\ddot{B}^{\circ}$ . . . . .            |
| <i>Boras Telluricus</i> . . . . .    | Tē $\ddot{B}^{\circ}$ . . . . .            |
| <i>bi Boras Telluricus</i> . . . . . | Tē $\ddot{B}^{\circ}$ . . . . .            |
| <i>Boras Thoricus</i> . . . . .      | Th $\ddot{B}$ . . . . .                    |
| <i>bi Boras Thoricus</i> . . . . .   | Th $\ddot{B}^{\circ}$ . . . . .            |
| <i>Boras Uranicus</i> . . . . .      | Ū $_{\circ}$ $\ddot{B}^{\circ}$ . . . . .  |
| <i>bi Boras Uranicus</i> . . . . .   | Ū $_{\circ}$ $\ddot{B}^{\circ}$ . . . . .  |
| <i>Boras Uranosus</i> . . . . .      | Ū $\ddot{B}$ . . . . .                     |
| <i>bi Boras Uranosus</i> . . . . .   | Ū $\ddot{B}^{\circ}$ . . . . .             |
| <i>Boras Vanadicus</i> . . . . .     | V̄ $\ddot{B}^{\circ}$ . . . . .            |
| <i>bi Boras Vanadicus</i> . . . . .  | V̄ $\ddot{B}^{\circ}$ . . . . .            |
| <i>Boras Yttricus</i> . . . . .      | Ẏ $\ddot{B}$ . . . . .                    |
| <i>bi Boras Yttricus</i> . . . . .   | Ẏ $\ddot{B}^{\circ}$ . . . . .            |
| <i>Boras Zincicus</i> . . . . .      | Zn $\ddot{B}$ . . . . .                    |
| <i>bi Boras Zincicus</i> . . . . .   | Zn $\ddot{B}^{\circ}$ . . . . .            |

| PONDERA ATOMORUM. |                    | PARTES CENTESIMALES. |       |                      |
|-------------------|--------------------|----------------------|-------|----------------------|
| O = 100           | H <sub>2</sub> = 1 | + E                  | — E   | H vel H <sub>2</sub> |
| 2205,91           | 176,36             | 60,45                | 39,55 |                      |
| 1830,71           | 146,70             | 76,18                | 23,82 |                      |
| 2266,91           | 181,65             | 61,52                | 38,48 |                      |
| 2911,39           | 233,29             | 55,05                | 44,95 |                      |
| 4220,00           | 338,15             | 37,98                | 62,02 |                      |
| 1807,70           | 144,85             | 51,74                | 48,26 |                      |
| 2680,11           | 214,76             | 34,90                | 65,10 |                      |
| 1271,50           | 101,89             | 65,69                | 34,31 |                      |
| 1707,70           | 136,84             | 48,91                | 51,09 |                      |
| 3221,52           | 258,15             | 59,38                | 40,62 |                      |
| 4530,13           | 363,01             | 42,23                | 57,77 |                      |
| 1083,49           | 86,82              | 59,74                | 40,26 |                      |
| 1519,69           | 121,77             | 42,59                | 57,41 |                      |
| 1874,17           | 150,18             | 53,45                | 46,55 |                      |
| 2746,58           | 220,09             | 36,47                | 63,53 |                      |
| 1181,11           | 102,66             | 63,07                | 36,93 |                      |
| 1717,31           | 137,61             | 49,20                | 50,80 |                      |
| 7031,33           | 563,53             | 81,39                | 18,61 |                      |
| 8339,94           | 668,39             | 68,62                | 31,38 |                      |
| 3247,57           | 260,24             | 86,57                | 13,43 |                      |
| 3683,77           | 295,19             | 76,32                | 23,68 |                      |
| 1929,30           | 154,59             | 54,78                | 45,22 |                      |
| 2801,71           | 224,50             | 37,72                | 62,28 |                      |
| 938,72            | 75,22              | 53,53                | 46,47 |                      |
| 1374,92           | 110,17             | 36,55                | 63,45 |                      |
| 939,44            | 75,26              | 53,57                | 46,43 |                      |
| 1375,64           | 110,21             | 36,58                | 63,42 |                      |



**FACILE METHOD OF PURIFYING MURIATIC ACID WHEN CONTAMINATED WITH ARSENIC.**—Wittstein discovered that muriatic acid, containing arsenic, may be completely purified therefrom by agitation with metallic quicksilver.—*B. R.*

### MEETING OF THE CHYMICAL SOCIETY.

December 6, 1842.

THE PRESIDENT, PROFESSOR GRAHAM, IN THE CHAIR.

1, A COMMUNICATION from W. H. Balmain, Esq. was read, announcing the discovery by him of a new compound of nitrogen and boron, which he names "ethogen," and its compounds "the ethonides." This substance, which is formed by heating boracic acid and mellon together, and obtained as a light white powder, appears to form a series of compounds with metals, several of which were described, and has some analogy to cyanogen, but containing boron in the place of carbon. Their atomic composition, however, has not yet been determined.

2. "Report of some Experiments with Saline Manures, containing Nitrogen, conducted on the Manor Farm, Havering-atte-Bower, Essex, in the occupation of C. Hall, Esq." communicated by W. M. F. Chatterley, Esq. The experiments were suggested by the prevailing opinion that the fertilizing power of some animal manures, and of the salts, nitre (nitrate of potash), nitrate of soda, and sulphate of ammonia, depend upon the proportion of nitrogen they contain. The salts mentioned are all, from their low price, within the reach of the farmer, and the quantity of the last thrown into the market is greatly increasing from the extension of the new mode of purifying coal gas from its ammonia by washing the gas with dilute sulphuric acid. The interest also of experiments with salts is greater than with mixed manures, both to the farmer, who, from the nature of the former substances, may depend upon their uniformity, and to the chymist, as their composition is necessarily known to him. A field of wheat was chosen which, in the latter end of April 1842, presented a thin plant; the salts were top-dressed over the land by hand, on the 12th of May, and the crop mowed on the 10th of August. The soil was rather poor, consisting of a heavy clay upon a subsoil of the London clay. 1. No manure; corn per acre 1,413 pounds. 2. With 28 pounds of sulphate of ammonia; corn 1,612 pounds. 3. With 140 pounds of the same salt; corn 1,999 pounds. 4. With 112 pounds of nitrate of soda; corn 1,905 pounds. 5. With 112 pounds of nitre; corn 1,890 pounds. The increase in the straw was also considerable in all cases, except with the small proportion of sulphate of ammonia. The total increase in the four manured crops was per cent., in the order in which they were enumerated,—14.1, 41.5, 34, and 33.5. The cost of the manure for the three last did not greatly differ, being 21s. 9d., 24s. 6d., 27s. 6d.; and the profit on the outlay was, with the small dose of sulphate of ammonia, 294 per cent.; with the large dose, 212 per cent.; with the nitrate of soda, 138 per cent.; and with the nitrate of potash, 92 per cent. The principal conclusions drawn by the author are, that the increase of nitrogen in the crop is greater than is accounted for by the nitrogen of the manures, showing that these manures have a stimulating effect, or enable the plants to draw additional nitrogenized food from the soil and atmosphere; the considerable superiority of sulphate of ammonia over the other salts, and the greater proportional efficiency of a small than of a large dose of that salt. The sulphate of ammonia costs 17s. per cwt. It appears best to apply this salt in the proportion of about 1 cwt. per acre, at three different dressings, the first quantity when the crop of wheat makes its spring growth; or, if of oats, when about two inches above the ground; the second quantity about a month afterwards; and the third at the time of the formation of the ear. To meet the practical difficulty of distributing so small a quantity as one-third of a hundred weight over an acre, about twice the quantity of common salt or of soot may be mixed with the ammoniacal salt. These, and most saline manures, when used as a top dressing, should be supplied to the plant when dry, after a shower of rain, or during hazy weather.—*Athenæum*.

\* \* \* Communications, Books for Review, &c. are requested to be addressed —"To the Editors of the ANNALS OF CHYMISTRY, care of Messrs. Longman, Brown, and Co. Paternoster Row."

WILSON AND OGILVY, 57, SKINNER STREET, SNOWHILL, LONDON.

THE  
ANNALS OF CHYMISTRY  
AND  
PRACTICAL PHARMACY.

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No. 13.] FRIDAY, DECEMBER 23, 1842. [VOL. I.

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WHAT DRUGS MAY AND SHOULD BE.

“ I have been sometimes amazed to see him, without the least hesitation, make up a physician's prescription, though he had not in his shop one medicine mentioned in it. Oyster-shells he could convert into crabs' eyes; common oil, into oil of sweet almonds; syrup of sugar into balsamic syrup; Thames water into *aqua cinnamomi*; turpentine into capivi; and a hundred more costly preparations were produced, in an instant, from the cheapest and coarsest drugs of the *Materia Medica*.”—SMOLLETT.

IT is to be regretted that the substitutions of one drug for another are too frequently less innocent than those stigmatised by the physician-novelist; if it is illaudable to substitute oyster-shells for crabs' eyes, what shall we say of chalk usurping the place of scammony, or the poisonous *coriaria myrtifolia* smuggled into the sick man's frame under the guise of senna?

Dr. Hodgson,\* of Philadelphia, mentions nitrate of silver, or something which passed under that respectable name, of which 75 per cent. was nitrate of potassa.

This was of American manufacture; but, without going so far west, we may find the white precipitate of mercury largely adulterated with oxide of lead. This is sold to the poor in penny-worths; and the shabby fraud is defended by the miserable excuse that it is to be used externally. But is it right to give lead for mercury? and can the former be safely rubbed upon the broken surface of a scald head? Assuredly not; for it will be absorbed.

Since manufacturers test the chloride of lime, why do not chymists do the same? Its price is from £18 to £28 the ton; and its quality varies with the price.

According to a correspondent of the *Pharmaceutical Journal*, cream of tartar worth 80s. per cwt. has been adulterated with an article of even less value than alum, presumed to have been sulphate of lime, or gypsum.

\* *Pharm. Journal*, No. VI., p. 254.

By treating the ponderous caustic magnesia with sulphuretted hydrogen, we ourselves have found it to contain lead. This may have been an accidental impurity; could we suppose it to have been a voluntary fraud, no words would be sufficiently strong to brand the malpractice. It is much used in the diseases of infants—a consideration which should make the adulterator pause; and the retail price of a shilling an ounce affords a profit sufficiently liberal to be an additional guarantee.

When the Sp. *Æther. Nitrici* is prepared of the specific gravity of 834, as directed by the London College, the cost of the spirit alone is 2s. 4d. for each pound of the preparation; while a quantity, of the sp. gr. 850, has been offered, nay, sold, at 1s. 10d. per lb. with 5 per cent. discount!

Instead of the colourless crystals of the acetate of morphia, we commonly see a dingy powder; yet so potent a medicine ought surely to be not only pure, but above suspicion. It is not sufficient to obtain the splendid crystals of some coloured salt, and place them under a French glass, to assure each passer-by of the manufacturer's skill; but the proprietor of a shop should examine every preparation when it is sent home to him. It is useless, when the mischief is done, to sigh over the adulteration of drugs, and lament that such things are; the evil must be stopped at the fountain-head. The retailer must not content himself with the humble consolation that his chymicals are as good as those of his neighbours; nor must he consent by his silence to the continuance of the practices of which he secretly complains.

The retailer's remedy is to create a competition among those who supply him, and thus raise their standard of excellence. When their goods have been once or twice returned, they will soon take effectual steps to find out the honest manufacturer. In fact, the wholesale druggist, being rather a merchant than a chymist, is too apt to treat the market as he finds it, and to supply orders, which, if they do not ask for adulteration, imply it; but show him that there is a demand for pure remedies, and gladly will he embrace a more reputable traffic.

Convince the retailer, that he will never be permitted the monopoly of unusual profits in adulterated drugs, but must share them with those who supply him, and jealousy, in the absence of any nobler feeling, may make him aspire to a higher path.

The superiority of the chymist's to the apothecary's shop is obvious, and is understood by the public as well as by the profession. Let it be his care, then, to maintain this superiority in essential as well as external points; and while the practitioner, distracted by the variety of his occupations, must take drugs as he finds them, let the chymist convert conjecture into certainty, by testing and trying.

The leading retailers should place their ban on any impure chymical preparation, and it will soon be rejected by all who deal in drugs.

The first-rate shops profess what we recommend: let us entreat them to practise what they profess. Let them not be sluggishly content to pay what they are charged, and take the purity of their drugs on trust, but let them examine what they receive, with balance and test-tube in their hands. They will thus compel manufacturers to engage the services of those who can produce pure remedies, and will encourage those who are educated for the business to enter thoroughly into its details. The wholesale dealer, too, will have his reward; for he will be less easily displaced by an inferior trader, when confidence is based, not on imagination, but on reality. At present the most trivial circumstance sometimes interrupts relations which deserved to be permanent. Too often a house relies for success not so much on the excellence of its drugs, as the importunity of its travellers.—What house, indeed, could dare to dispense with this costly medium of solicitation, and trust merely to the purity of its medicines?

We trust that no one, in any walk of our profession, will misunderstand the scope of our observations. It is to the whole body of chymists and druggists that we address ourselves. We are of them, and with them: we write to amend, not to destroy. The admonition of a friend differs from the censure of an enemy, as the probe of the surgeon does from the dagger of the assassin.

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## CHYMISTRY, OPERATIVE AND EXPERIMENTAL.

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ART. II.—*Apparatus for Organic Analysis.* By O. L. ERDMANN and R. F. MARCHAND.

[Continued from page 368.]

THE tube containing the potassa is united with the tube of combustion, either, as indicated in the drawing, by a cork, or, as we

now prefer, by a tube of Indian rubber, which, beginning from the potassa tube, gradually becomes smaller, assuming a conical form, or which is at both extremities as wide as may be requisite to admit the diameter of the tube of combustion, this latter being fastened to the mouth-piece of the potassa tube by means of a perforated cork covered with sealing-wax.

The filling and preparing of the tube of combustion depends, of course, on the qualities of the body to be burnt, according to which some variations may be required. We usually proceed, for the combustion of solid bodies, in the following way:—

A stopper of fine copper turnings is placed in the fore part of the tube\*, which it closes tight enough to prevent the oxide of copper from falling through, without, however, impeding the current of gas. The common copper turnings are not at all adapted for this purpose, because they are very brittle. The fine and elastic wires required, are best obtained by winding very fine copperplate, such as is employed for manufacturing gold-lace, tightly round an iron wire, and turning it off by means of a lathe from one end of the cylinder. If the chisel is well selected, the workman soon succeeds, after a little practice, in cutting the copperplate into stripes almost as fine as a hair, which may easily be formed into loose stoppers, and applied for various purposes in organic analyses.

The glass-tube being provided with the copper stopper, and having a length of from 2 to 2½ feet, is filled with oxide of copper to two-thirds of its whole length, and it is then adapted to the tube containing potassa, in order to thoroughly heat the oxide. In order to protect the tube, it is placed in a trough of thin iron plate, the borders of which are sufficiently high to prevent the flame of the lamp from immediately touching the tube on its side. In order to prevent the tube from adhering, by partial fusion, to the coating of oxide which forms on the iron, the inside of the trough is covered with some burnt magnesia. By employing this precaution the tubes never burst: the same tube may be repeatedly employed, until it has become so opaque that the contents during filling and mixing cannot be perceived. We have executed twelve combustions in the same tube. The tube being placed over the lamp is then heated to a red heat, and in this state a slow stream of dry air is passed through it. This is procured by means of a gasometer filled with atmospheric air, and placed beside the gasometer containing oxygen; and the termination of the atmospheric gasometer opens into that part of the tube for conducting the oxygen which is placed between the tap above described and the apparatus for sulphuric acid. This gasometer, which we shall call the Air-gasometer, is precisely of

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\* The Bohemian glass-tubes have a decided preference above all others which we have hitherto tried, as they are not easily fused to bending or to bursting.

the same construction as that for the oxygen. It is, however, sufficient to regulate the movements of the tap by means of a lever. If the tap of the air-gasometer has been opened, and that of the vessel for the oxygen closed, atmospheric air, of course, only passes through the apparatus; if the contrary, oxygen: and thus a stream of the one or the other can be obtained alternately. A tube of chloride of calcium is fixed to the open mouth of a tube, by means of a perforated cork coated with lead, in which oxide of copper is kept red-hot in the stream of air, after the greater part of the moisture contained therein has been previously expelled. Perfect ignition being completed, for which purpose, during a moderate current of air, at most a quarter of an hour is required, the lamp is gradually extinguished, and the oxide is allowed to cool also in a slow current of air.

The substance to be burnt is brought into the tube of combustion either by means of a somewhat long tube, closed by fusion at one end, or immediately from the drying apparatus, and then mixed with the oxide of copper by means of a well-polished brass wire, bent in the form of a cork-screw at the lower end. It is, of course, only requisite to mix the substance somewhat uniformly with the oxide of copper, and not to mix both perfectly well. Care, however, should be taken that no portion of the substance arrives at the fore part of the tube, in order that a layer of pure oxide of copper, to the length of five or six inches, may remain in advance of the mixture. After the wire has been taken out, the hind part of the tube of combustion is rinsed downwards with some oxide of copper, which has been previously heated to redness over the lamp in a platina crucible, and allowed to cool in a narrow tube, from which it is at once brought into the tube of combustion,—the uppermost portion, or that which had been in contact with the air, being rejected.

The operation of filling the tube being performed, it is pushed on, care being taken that the body contained therein always remains at a distance of four or five inches from the further end of the tube, which, of course, must always be maintained cold, to avoid heating the tube of Indian rubber.

For the combustion of very volatile bodies, it is advisable to use a tube whose length is three feet, and to fill the first third of it entirely with copper-shavings, which, at a red heat, oxidate in the current of air, thus forming a porous mass of oxide, which does not admit of the passage of any part of the substance without being burnt. In the event of bodies containing a large quantity of azote, it is likewise proper to place copper turnings in the fore part of the tube. Care must, however, be taken that the foremost portion remains unburnt, which is easily arranged, since the back parts, when first heated to redness, only permit air not containing oxygen to pass into the fore part of the tube.

As the bright copper plate becomes covered during rolling out with a thin film of oil, a well-heated plate, such as may be obtained in factories, should be employed for this purpose, especially since it may be easier treated on the lathe than that which has not been heated.

As an apparatus destined to receive the water, we employ a vessel of the shape represented in the drawing. It yields this advantage, that the water formed is for the greater part obtained separate in the empty bowl, and may be tested as to its purity. The same apparatus may be used for many analyses; the water being removed without requiring the tube to be refilled, since a small part only of the water arrives at the chloride of calcium.

The cork which unites the tube of chloride of calcium with the tube of combustion is coated with lead. This is managed by simple manipulation. After the cork has been properly perforated, a circular disc is cut out from a lead plate; this latter ought not to be very thin, and the diameter of this disc should be by some lines larger than the surface of the cork, for the protection of which it is intended to serve. This is placed on the under surface of the cork, and the projecting rim bent in small folds around the sides of the cork. The well-turned mouth of the chloride of calcium tube is then placed on the lead over the hole, and, by gently pressing and turning, a hole is produced in the lead as deep as the metal will allow. After some little practice the lead may be perforated in such a way that a small round disc falls through the hole of the cork, whilst the cork itself is lined with a short tube of thin lead plate, through which the tube of chloride of calcium is finally passed, for the purpose of being again placed in the cork from the opposite side of the hole.

During this latter operation, it may occur that the lead plate is pushed from the cork, in which case the coating with lead must be repeated. The tube of chloride of calcium may, however, easily be introduced by careful management, so that it remains entirely surrounded by the short lead tube. The cork, when placed in the tube of combustion, is nowhere in contact with the gases and fumes steaming from the tube. Both come in contact with glass and lead alone; and the cork cannot absorb the vapour any more than a solid metal stopper, nor can any moisture enter into the tubes from the cork provided the lead be firmly pressed against the glass.

For the reception of carbonic acid the usual Liebig's three-bulb apparatus is employed, behind which a tube, bent in the shape of an U, and filled with pieces of potassa, is adapted, in order to condense the vapour carried out by the dry current of air passing through the ley of potassa. A tube, for containing potassa, is finally adapted to the former, and is intended for ascertaining by suction (by the breath) that the apparatus is every-

where well closed, so as to prevent the influence of the exterior atmospheric air on the receivers.

The management of the process of combustion is conducted without difficulty, and directed in the same manner as by employing charcoal fire. The fore part of the tube, containing pure oxide of copper, is first heated to redness; a burning wick is then placed under the back part of the tube, containing also pure oxide, and at the same time a feeble current of oxygen is passed through the tube, thus testing the dryness of the oxide of copper. The mixture of combustible matter and copper is then gradually heated, by pushing on the first wick, and replacing it by a second, third, and so on, whilst no more oxygen passes through the apparatus than is required for preventing the water and carbonic acid from returning into the drying tubes. After the reduction of a certain quantity of copper the air is increased; never, however, to such an extent as to cause free oxygen gas to pass through the apparatus.

After the experiment has been continued for some time the gas is completely absorbed; the tube being then brought to a red-heat throughout its whole length, and the evolution of gas ceasing, the current of oxygen is increased. The reduced copper is then observed to burn, whilst a feeble evolution of gas sometimes takes place; for now those parts of the substance only which have remained hitherto unburnt are completely consumed. As soon as the whole of the copper is burnt, and free oxygen begins to stream out from the apparatus, the oxygen gasometer is closed, the lamp extinguished, and a slow current of atmospheric air directed through the apparatus, in order to expel the oxygen gas contained therein, which is kept up for about a quarter of an hour, or somewhat longer, until the condensing vessels are perfectly cool.

The combustion of liquid bodies in the current of oxygen is seldom attended with any difficulties. They are placed in the tube, and contained in small cylinders of thin glass closed at the end by fusion, which are then burst by gentle heating. Care must be taken that these small tubes may be completely filled, in order that they may burst by the expansion of the liquor, and not by the action of the evolved steam. In the first instance, the bursting takes place easily, and without a perceptible evolution of steam. This apparatus is not fit, however, for very volatile liquors. During the combustion of these bodies in a current of oxygen, detonations easily occur, and if not sufficiently powerful to burst the tubes, they cause failure of the experiment; besides which, the application of oxygen is in general unnecessary for the combustion of such bodies, being commonly very inflammable of themselves. In burning heavy volatile bodies, as Naphthaline, Benzine, Oil of Cloves, &c. we never observed any detonation.



Soft substances and tough liquids—*e. g.* Wax, fat oils, &c.—are best burnt in small and oblong open vessels. The management of the combustion is, however, more difficult in this case, than with substances which admit of being mixed with the oxide.

One advantage of the combustion in the oxygen apparatus we have described above, is the rapidity with which the analysis may be performed; and, indeed, it requires merely the manipulation which has been related upon a first combustion, when executed with a new tube. After the first combustion has been finished, and the chloride of calcium apparatus removed, the tube of combustion is closed with a cork coated with lead, and another substance may then be instantly introduced, since the copper then contains simply heated oxide of copper.

In closing this article we have to observe, that the before-described apparatus of combustion is furnished, on order, by Messrs. Luhme and Co., of Berlin, and M. Müller, of Leipzig, (*blauer Hecht.*)—*Journ. f. pr. Chemie*, xxvii. 3.

ART. III.—*On the Analysis of Oxgall, and the Characteristic Properties of its Elements.* By the Baron J. BERZELIUS.

[From the Kongl. Vet. Acad. Handl.]

[Continued from page 335.]

2. *Bilis Bubula Spissata of the Druggists.*—How long this sample of gall had been kept in the shop I never have been able to ascertain. The proprietor of the shop considered it as some months old. It was of the consistency of honey, and of an ammoniacal smell, with the peculiar odour of bile. After being further concentrated by the application of heat, a tincture was prepared from it with pure anhydrous alcohol, and the extract, after expelling the alcohol, submitted to examination.

The solution of the alcoholic extract in water was at once precipitated by muriatic acid, which produced a greenish plaster like precipitate, and a colourless acid, and somewhat bitter mother liquor, whose contents of bilin were not examined.

The plaster-like precipitate was dissolved in caustic ammonia, the solution diluted with a good deal of water, and boiled. This operation produced a precipitate, which gradually increased, and did not liquefy when the liquor arrived at the boiling point. Ebullition was continued, whilst the water consumed by evaporation was replaced, until the precipitate did not appear to increase any further. The disengaged greyish-green precipitate was washed, dissolved in carbonate of soda, again precipitated by muriatic acid, then treated with small portions of ether until it ceased to assume a green colour, dissolved in alkali, and muriatic acid added to this solution, which then yielded a colourless precipitate, being cholanin acid.

The solution in caustic ammonia, and which had been boiled, was precipitated with muriatic acid. A plaster-like mass appeared, which was treated, according to the above stated method, alternately with ether and oxide of lead.

The ethereal solution having been left to stand for some days, some few crystals of cholic acid formed, which were removed, when the ethereal solution, after being distilled with water of barytes, yielded a considerable quantity of fellanic acid, and also, but in less quantity, fellinic acid; but little cholinic acid was found mixed with the cholanic acid. For the purpose of separating the two latter I have not been able to discover any very appropriate method.

The solution of bilin yielded, on the application of oxide of lead, bilin, almost colourless, and the plaster-like combination of oxide of lead yielded to alcohol, and afterwards, when treated with carbonate of soda an extract of bilifellanic acid, and bilifellinic acid and a small quantity of bilicholinic acid, which was treated in the manner already stated.

This examination, therefore, proved that a great portion of the bilin had already disappeared from the gall, that a great quantity of fellanic acid had formed, that the quantity of cholinic acid had taken its place.

3. *Old gall (not evaporated while fresh).*—In a butcher's shop some gall had been collected from torn gall-bladders in order to preserve it for customers. The collection of the quantity which I received had been commenced a fortnight before. This was in the month of May, when the temperature of the atmosphere does generally not amount to more than  $+16^{\circ}$  (R). The colour of the gall had changed into brown, and it had a putrid and ammoniacal odour.)

It was first evaporated and kept in the water bath until the putrid and ammoniacal odour disappeared. The dried mass was digested with anhydrous alcohol, and the alcoholic solution thus obtained further treated with acetate of lead.

The neutral salt of oxide of lead produced a precipitate which at first disappeared, but afterwards remained, and when washed and dried was of a pale grayish-yellow colour. It was decomposed in alcohol, with sulphuretted hydrogen, after which the alcohol contained scarcely any thing but fatty acids, a still greater quantity of which were obtained from the sulphuret of lead by boiling it with alcohol. During the spontaneous evaporation, margaric acid and stearic acid in colourless crystals were formed leaving a yellow ley containing oleic and cholinic acids.

The alcoholic solution, after being precipitated with the solution of sugar of lead, was now precipitated with diacetate of lead; the precipitates redissolved, wherefore the diacetate of lead

was added in excess, and the liquor allowed to stand for twelve hours, during which time a slight, plaster-like, semi-transparent, yellowish precipitate deposited.

This precipitate was removed, washed, decomposed by sulphuretted hydrogen in alcohol, the alcohol then removed by distillation, and the residue treated with ether. This extracted the fatty acids, and a quantity of that mass, which we termed eulysin, having passed into an indifferent condition.

The ether left a brown liquid behind, which was insoluble in water, and did not yield any bilin to water, but dissolved in dilute ammonia; chloride of barium precipitated from this solution a glutinous salt of barytes and muriatic acid disengaged from the precipitated solution a coherent acid.

Both seemed to have been acids united with bilin of a kind not decomposable by ether, because the acid is not sufficiently soluble therein. The quantity was not considerable enough for undertaking experiments with the hope of giving decisive results so as to ascertain their nature accurately.

The alcoholic liquor being mixed with acetate of lead was evaporated to a small volume, and then mixed with a good deal of warm water, when a plaster like combination of lead was precipitated. It was then further evaporated until the alcohol was expelled, after cooling, decanted, and the plaster-like mass repeatedly kneaded with boiling water, in order to extract therefrom the whole of the acetate of lead.

The aqueous solution was evaporated to dryness, after which anhydrous alcohol extracted from the residue a very slight quantity of bilin containing acetate of soda. Those parts which were insoluble in alcohol contained so great a quantity of basic and neutral acetate of lead, carbonate of lead, &c., that I did not consider it worth the trouble of submitting them to further examination.

The plaster-like precipitate of lead was decomposed with acetate of soda, and the soda solution precipitated with sulphuric acid, which produced a plaster-like precipitate, perfectly insoluble in water; in which point, therefore, this differed from fresh gall.

The acid liquor being filtered, and treated with carbonate of lime and oxide of lead, according to the previously stated method, yielded an almost colourless and pure bilin in rather considerable quantity.

The precipitated glutinous mass was treated with ether, which dissolved the greater part of it, leaving behind a very small quantity of liquid bilin, and besides that a semi-fluid magma of the same kind, and insoluble in water, as we shall shew further on. The ethereal solution left, on distillation, a clear yellow mass, which was perfectly soluble in carbonate of soda.

The soda solution was repeatedly treated with ether, which took from it at first a yellowish colour. After expression of the ether, by distillation, an oily body remained, which floated on water, and was not fatty but soft, glutinous, and easily soluble in alcohols. It consisted of elain and eulysin mixed together, and these could only be separated from each other by treating them with caustic potassa in alcohol, and disengaging the acids by ether and water of barytes, in the manner previously stated.

[To be continued.]

ART. IV.—*On the Atomic Weight of Lanthanum.* By  
CHOUBINE.

[Bull. Scientif. de l'Acad. de St. Petersb. 1842.]

IN the beginning of December last year, Mr. Hess requested me to undertake an analysis of the *tschewkinite* newly discovered by Mr. G. Rose. This mineral consists of silicic acid, protoxide of iron, cerium, lanthanum, and titanitic acid, with a slight addition of the oxides of aluminum and calcium.

In order to obtain precise views as to the composition of this metal, I instituted several researches in reference to the chymical properties of the oxide of lanthanum and the atomic weight of this substance.

In order to obtain the oxide of lanthanum requisite for this purpose, I dissolved about eighty grains of *tschewkinite* in aqua regia, when silicic acid alone was left behind. The oxide of iron was removed by benzoate of ammonia from the solution previously neutralized by ammonia, and the oxides of lanthanum and cerium precipitated together from the filtered solution. The copious precipitate was washed, dried, and thoroughly heated.

The oxides, after being heated to redness, were digested with nitric acid, diluted with 100 parts of water at a gentle heat, and the filtered liquid, which contained lanthanum and lime, was freed from the oxide of lanthanum by ammonia. In order to separate this from any trace of lime, it was dissolved in a solution of hydrochlorate of ammonia, and precipitated a second time by ammonia, when it was precipitated free from any foreign substance.

The solutions of the oxide of lanthanum in an acid are acted upon by reagents in the following manner:—

1. Potassa produces therein a copious white precipitate, insoluble in an excess of the precipitant.
2. Ammonia produces the same effect.
3. The carbonates and bicarbonates of potassa or ammonia produce a white precipitate, insoluble in an excess of the precipitant.

4. The neutral saline oxalates produce a white pulverulent precipitate of oxalate of lanthanum, insoluble in water, and also in saline solutions, whether neutral or alkaline.

5. Phosphate of soda yields a white precipitate, soluble in acids.

6. A current of sulphuretted hydrogen, or sulphuretted hydrogen-water, does not produce any precipitate.

7. A solution of sulphuret of ammonium (bihydrosulphuret of ammonia) produces a copious white precipitate, consisting only of hydrated oxide of lanthanum.

In order to define the atomic weight of lanthanum, I converted the oxide into bichloride, and into the double salt of lanthano-sulphate of potassa.

1. Hydrochloric acid was passed over the oxide at a temperature of red heat. 1·8885 grains yielded 2·9800 grains of bichloride of lanthanum.

2. This salt, being dissolved in water, yielded, when precipitated with the nitrate of oxide of silver, 5·9769 grains of chloride of silver, or 1·4745 of chlorine. The first experiment yields an atomic weight of 457·872; the second, of 451·956; medium result, 451·914.

3. 6·0 grains of lanthano-sulphate of potassa yielded—

|                                      | Quantity of Oxygen. |
|--------------------------------------|---------------------|
| Oxide of Lanthanum . . . . .         | 1·5414 :: 0·2792    |
| Sulphate of Barytes 8·149, therefore |                     |
| Sulphuric Acid . . . . .             | 2·8009 :: 1·6766    |
| Sulphate of Potassa 3·050, therefore |                     |
| Potassa . . . . .                    | 1·6490 :: 0·2795    |
|                                      | <hr/> 5·9913        |

The quantities of oxygen in the potassa and oxide of lanthanum are equal, and together amount to one-third of that contained in the sulphuric acid. The oxide of lanthanum, is, therefore, = Ln. The last analysis fixes the atomic weight at 451·879.

#### POSTSCRIPT OF THE EDITORS.

A short time since M. Rammelsberg also endeavoured to fix the atomic weight of the oxide of lanthanum; and he found it, by decomposing the sulphate, to be 454·88. The operation which has in both cases been employed for separating the oxide of cerium from the oxide of lanthanum—that is to say, by digesting the mixture heated to redness with very weak nitric acid—is, however, in no way fitted for producing a perfect separation. We did not succeed in obtaining by this process an oxide of lanthanum, which was no longer precipitated by sulphate of potassa, whilst the oxide of cerium left behind still always con-

tained lanthanum. This method of separation was, perhaps, well suited for pointing out a new substance possessing different properties in the mixed oxide of cerium. It is, however, not so well adapted for the purpose of completely separating both substances from each other.

As the new metal was discovered, now four years ago, by Mosander, and it is not probable that he should have relinquished the pursuit of so interesting an object, it may be presumed that this clever chymist met with difficulties during his researches which are not usually met with in the common researches concerning the composition of salts of metallic oxides. The intention of stoichiometrically defining the oxide of lanthanum, purified by so uncertain a process, and without waiting for the result of M. Mosander's researches, may be deemed, perhaps, somewhat premature.

The supposition that some peculiar points are still to be taken into consideration in researches on the combinations of cerium and lanthanum, has, indeed, proved correct. M. Mosander communicated, at the last meeting of the Scandinavian Association, the interesting fact, that he discovered, in all minerals containing cerium or lanthanum, a *third new metal*, which he termed, from its resemblance to lanthanum, *didymum* (*διδυμος*, double, twin). The separation of cerium and lanthanum from this new metal is exceedingly difficult, and cannot be executed in the common way. Since all these three metals are met with in all minerals containing cerium, in some quantity, and, therefore, likewise in all oxides of cerium hitherto procured, lanthanum and didymum more especially, in some quantity, they cannot be reckoned amongst the number of very rare elements.

Independent of Mosander's experiments, Scheerer, of Christiana, has made several observations during the examination of some Norwegian minerals, which cannot be explained by the action of such metals as are already known, but which find a sufficient explanation in the properties of didymum.

We hope to be able very soon to give more detailed information concerning this interesting subject, and to obtain from Mosander his complete examination of lanthanum.—*Journ. f. pr. Chemie.*

#### ART. V.—On *Rhamnine*. By FLEURY.

RHAMNINE occurs in the juice and marrow of the berries of buckthorn, from which it separates either immediately on expression, or after a certain time. It forms the thick lumps which are sometimes met with in the syrup of buckthorn.

Its exterior appearance varies. Sometimes it forms light flakes, which may be easily dried without coagulating; some-

times small grains, or cauliflower-like masses. The writer observed, in one instance, only fine needles, united so as to form a bundle. It is of a pale-yellow colour, of a peculiar, not very prominent, taste, somewhat approaching to that of dough. It is incapable of undergoing the spirituous fermentation; does not dissolve in ether and cold alcohol, but easily in boiling alcohol, and crystallizes from this solution in a mass containing the whole of the spirit of wine like mannite. It does not dissolve in cold water, or, at any rate, only to a very minute extent, and is without odour. In boiling water, however, it yields a very powerful odour.

Rhamnine dissolves in a ley of potassa with a yellow colour. It is likewise dissolved by ammonia, carbonate of potassa, and carbonate of soda, yielding a beautiful yellow colour. If some drops of diluted sulphuric acid are added to these solutions, they instantly lose their colour, and rhamnine is precipitated.

If the solution of rhamnine in pure potassa is evaporated, a brown mass is obtained, glittering when broken, and absorbing very little humidity from the air. A very small quantity of this mass is sufficient to impart a beautiful yellow colour to a large quantity of water. Nitric acid dissolves rhamnine in the cold, assuming a dark-brown colour. This colour remains if the solution be further diluted, and the rhamnine also remains dissolved. Sulphuric and muriatic acids likewise dissolve it when cold, and the solution assumes a beautiful saffron-yellow colour. If water, however, be added, the colour disappears at once, and rhamnine separates.

Diluted sulphuric acid dissolves it with the aid of heat; but on cooling it is deposited. If nitric acid is heated with rhamnine, the latter dissolves with a dark-brown colour. If the heating is continued, the solution becomes lighter, and finally remains pale yellow. If evaporated, a crystalline mass is obtained, the greater part of which dissolves in water with a beautiful yellow colour: the residue consists of a yellow powder, or threads of a strong and permanently bitter taste. If the aqueous solution is much evaporated, and some cold water quickly added to it, a great number of small crystals are formed; and those parts which remain dissolved consist chiefly of oxalic acid. The crystals, after being separated from the oxalic acid and the bitter matter, possess the following properties:—They form beautiful yellow, very short, fern-like grouped needles; dissolve easily in cold alcohol, imparting to it a yellow colour. Cold water dissolves little of it: hot water much more. This solution neither produces a precipitate nor any other change in solutions of sulphate of iron, potassa, soda, and copper, (the latter becomes green from the mixture of yellow and blue), alum, sugar of lead, iodide of potassium, chloride of barium, nitrate of silver, and of the

chloride of quicksilver. Sulphuric and muriatic acids instantly decolour the solution; and by evaporation crystals are obtained of the same form, however, as before. Ammonia dissolves them easily, and with a saffron yellow colour. The solution evaporated in the sun, separates into two parts, one of which crystallizes, forming long golden yellow needles; the other forms a non-crystalline orange yellow mass.

Rhamnine may be prepared from the berries in the following manner:—The juice is expressed from the berries when still somewhat unripe, and the residue (the marrow) boiled with water and strained. From the solution a cauliflower-like crystalline mass deposits on cooling in apparently considerable quantity. The marrow is digested twice or three times in boiling water, and yields some more impure rhamnine. After it is allowed to stand for several days, the rhamnine is collected on linen from all the dissolved portions, and pressed, when it loses considerably in bulk. By treating with boiling alcohol, filtering, and cooling, it is obtained in the crystalline form. With a view to its purification, it must be macerated in cold water, and afterwards, for several times, in dilute spirit of wine, which does not sensibly act on it when cold. Finally, it is again dissolved in concentrated boiling alcohol, and crystallized. The application of pure animal charcoal will accelerate the purification.

While the juice of the berries is undergoing fermentation, a portion of rhamnin gathers on the surface of the liquid, and may be purified in the way above stated. It may be observed that rhamnin obtained from the juice is much less pure, and exists in much smaller quantity, than that contained in the marrow.—*Journal de Pharm.* 1841, p. 660-670.

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## CHEMISTRY APPLIED TO AGRICULTURE.

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### ART. VI.—*Analysis of Soils.*

[Continued from page 375.]

#### PRODUCTS OF DECOMPOSITION ON THE SURFACE OF THE EARTH.

THOSE vegetable matters which moulder on the surface of the earth finally leave a blackish-brown pulverulent mass, which has received the name of mould (*humus*).

All that vegetation of the year which becomes extinct on the approach of winter is gradually converted into mould, and becomes mingled with the land in which the plant has vegetated: whence it occurs that the extreme surface of the earth contains from one to several per cent. of mould, which serves for the nutrition of the vegetable matters of the succeeding year. This



mould, as found in soils, is often mixed with products in a less advanced stage of putrefaction, and sometimes with vegetable matter unaltered, consisting chiefly of loose roots. If we examine the mould of cultivated land, we find it is composed of various mixtures; but it is always easy to extract therefrom those elementary matters which characterize it.

During the transformation of vegetable matters into mould, the first portion of their substance is converted into a blackish-brown principle which possesses all the characters of insoluble extractive\* (apothema), such as is obtained from that portion of an extract when it is divided into its soluble and insoluble constituents.

The salts formed by the organic acids contained in the vegetable matter are destroyed, inasmuch as the elements of the acid are resolved into water and carbonic acid, whilst the base combines with the matter analogous to apothema, of which mould is chiefly composed.

The salts formed by the inorganic acids remain, unless they are soluble; in which case they are carried off by rain. Besides which, mould contains a body almost insoluble in water, but which colours it yellow, and a carbonaceous residue, totally insoluble, which appears to be one of the products of a more advanced stage of the decomposition of organic matters.

In order to furnish an example of the complete formation of a mould of vegetable origin, we will narrate the results of an analysis to which Braconnot submitted some wheat which had remained during several centuries in a damp soil, whose approaches were closed by earth, and whose existence had been forgotten, until by chance it was re-opened. The grains had preserved their form and the brilliancy of their exterior pellicle; but they were black, and were reduced to powder on the slightest pressure. Boiled in water, the solution was yellow, and left, on desiccation, a saline mass of a brownish yellow, which burnt with detonation when heated, and which, beside the before-cited substances soluble in water, contained nitrate of potassa, nitrate of lime, and a little of the chlorides of calcium and potassium. The nitrates were the results of the oxidation of the nitrogen contained in the gluten and vegetable albumen, and of the combination of nitric acid produced with bases previously combined

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\* [It may be necessary to explain to our agricultural readers that when the juice-decoction or infusion of a vegetable has been evaporated in the open air to the consistence of honey, almost all the delicate vegetable principles which were in the normal liquid are decomposed; the pharmacist's explanation being, that it absorbs oxygen from the air. By treating with distilled water it is divided into two portions, the soluble portions, part of which are uninjured, and part decomposed, (in the extract of dandelion, a bitter resinous matter, and its starch are converted into a saccharine principle), and the insoluble portion, whose very insolubility proves that it has been decomposed, and which has received the designation of insoluble extractive, or apothema, and is probably identical with humus.—Ed. A.C.]

with vegetable acids. The weight of the mass soluble in water, including the salts and all other principles, did not amount to more than  $1\frac{1}{2}$  per cent. of the weight of the black grain. When the part insoluble in water was boiled in alcohol, this latter removed a light trace of a brown substance which remained after the evaporation of the alcohol, and had the consistence of wax. The mass exhausted by water and boiling alcohol was gently heated with a weak ley of caustic potassa, which was thereby saturated and coloured of a brownish-black; and by continuing this treatment with fresh ley of potassa, it became charged with some portion thereof. This substance was precipitated from its solution by an acid. It was the body analogous to apothema, which has been already mentioned, and whose weight amounted to  $20\frac{1}{2}$  per cent. The portion of matter insoluble in the alkali maintained the same appearance. Treated with dilute hydrochloric acid, it yielded a certain portion of lime, oxide of iron, and phosphate of lime. The residue was again acted on by potassa, which removed a very large portion of a body analogous to apothema. This was afterwards combined with lime; and in this state it resisted the action of potassa. The calcareous combination was 42 hundredths. The 30 per cent. remaining consisted of a black matter, carbonaceous, insoluble in this solvent.

[We earnestly recommend to the pharmaceutical chymist a perusal of the above interesting particulars, as affording some clue to the, at present, unsolved problem of the changes which occur in the active principles of vegetables when their infusions are evaporated in the open air.—E.D.]

[To be continued.]

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## PRACTICAL PHARMACY.

ART. VII.—*On Phenyl, and the Combinations therefrom derived.*  
By A. LAURENT.

[Continued from page 381.]

ON adding hot water the white mass was divided into two layers, one white and oily, and another more heavy and aqueous. They were separated and neutralised with muriatic acid: an oil separated lighter than the solution of chloride of potassium, and which, after being washed with some water, was changed almost entirely into chlorophenisinic acid by the action of chlorine. In order to obtain this matter in a pure state, it was digested with chloride of calcium, and submitted to distillation. After five or six similar operations I obtained an oily matter, boiling at  $187$  or  $188^{\circ}$ , =  $368$  or  $370^{\circ}$  F. As this matter condensed almost entirely at from  $8$  to  $10^{\circ}$ , =  $46$  to  $50^{\circ}$  F., I allowed

it to cool slowly, and decanted the liquid part after one half thereof had half crystallized. The crystals thus obtained are sufficiently pure, they cannot be further purified by pressing them between bibulous paper; care must be taken not to cool it too much, but slowly, in order that large crystals may be formed, from which the liquid easily separates. The liquid must be contained in a closed vessel; and, after one half thereof has thickened, the bottle is placed, with the mouth downwards, in another vessel, thus closing the mouth of the latter, in order to exclude the air,

The properties of this body, which I term hydrate of phenyl, have a very great analogy with those of creosote and the carbolic acid of Runge; it is even probable, that the carbolic acid of Runge is only an impure hydrate of phenyl. I will distinguish the properties which it has in common with the creosote by K, and those which it has in common with the carbolic acid by a C.

The hydrate of phenyl, or phenic acid, is solid, colourless, and crystallizes in long needles, probably belonging to the straight prismatic system, with a rectangular base. It melts (fuses) at  $34$  or  $35^{\circ} = 93$  or  $95^{\circ}$  F., and boils at  $187$  or  $188^{\circ} = 368$  or  $370^{\circ}$  F. Creosote does not even solidify at  $27^{\circ} = 80^{\circ}$  F.; in carbolic acid, needles were sometimes observed melting above  $15^{\circ} = 59^{\circ}$  F. Creosote boils at  $203^{\circ} = 397^{\circ}$  F., and the carbolic acid at  $197.5^{\circ} = 355.5^{\circ}$  F. The taste and smell remind one very strongly of creosote, C.

In toothache it produces the same effects as creosote. It acts powerfully on the skin of the lips, &c. K. C.

Its specific gravity is  $= 1.065$  at  $18^{\circ} = 64^{\circ}$  F.; of creosote,  $= 1.037$  at  $20^{\circ} = 68^{\circ}$  F.; and that of carbolic acid,  $= 1.062$  at  $20^{\circ} = 68^{\circ}$  F.

The hydrate of phenyl burns with a sooty flame. The crystals instantly deliquesce in the air; it seems as if the slightest humidity were sufficient to effect this change, for the crystals and oil indicated almost exactly the same composition. It dissolves water, and is also dissolved by water in small quantity, K. C. Alcohol and ether dissolve it in all proportions; and a few drops of these liquids are sufficient to prevent its crystallization at ordinary temperatures.

It dissolves sulphur; which, on cooling, separates in rhombic octohedrous crystals, K. C. It coagulates the white of egg, K. C., and easily dissolves in acetic acid. Iodine is, as it appears, dissolved without alteration, K. C.

It decomposes bromine, violently causing the evolution of hydrobromic acid. After the reaction has subsided, a crystalline mass is obtained, to which I shall return presently.

By the action of bromine on creosote a brown oil remains, which by no means resembles the substance obtained from hy-

drate of phenyl. Runge did not examine the behaviour of carbolic acid towards bromine. According to this chymist, it is decomposed by chlorine during formation of muriatic acid ; when distilled, it again becomes colourless, possessing, however, other properties. The hydrate of phenyl furnishes muriatic acid with chlorine, then crystallized chlorophenisinic acid. Creosote is easily decomposed by chlorine ; a brown substance is produced, which contains no chlorophenisinic acid.

The hydrate of phenyl is very powerfully acted upon by nitric acid ; every drop of this acid, which is allowed to fall into it, producing a hissing sound, like red-hot iron dipped in water. Boiled with the same it is completely decomposed into picric acid. Creosote and nitric acid furnish oleic acid. Carbolic acid assumes, according to Runge, a brown colour by agitation ; a black resin and also a red liquid are produced.

[To be continued.]

#### ART. VIII.—*Distilled Waters.*

DISTILLED Waters are prepared in the following way by Tassing :—

A tin still is placed in the boiler, provided with a second and perforated false bottom, 1" situate above the former. The space above the false bottom is filled with the substance to be extracted. The steam enters the interstice between the bottoms from the boiler, through a tin tube, and carries in its passage through the herb, &c. all the volatile elements. Bottles, capable of containing twenty ounces, are completely filled with the water, by repeatedly placing them on the steam apparatus so as to expel the air, and then, whilst still hot, and without applying a cork, they should be covered with a wet bladder, which is then fastened with a string to the neck of the bottle, and coated with sealing-wax. They are kept in cool and dark cupboards. The bottles in use are closed with a cork, and placed in tin-boxes. Distilled water of fruits, prepared as aqua duplex or triplex, keep especially well in this manner.—*Pharm. C. Bl.* Oct. 1842.

#### ART. IX.—*Distilled Waters.*

MULLER is of opinion,—not so the late Brandes,—that the circumstance of distilled waters seldom keeping well for any space of time, is to be ascribed mainly to the impurity of the spring-water ; and, to assist in their preservation, first of all the water employed should be as pure as possible, and also free from carbonic acid. He employs pure river, or rain water, or melted snow, adding at the same time, during distillation, to each pound of distilled water, half an ounce of pulverised charcoal. He thinks he has observed, that the essential oil thereby unites in greater quantity and more intimately with the water,

and that the product keeps better. In order to obtain waters which keep well, such vegetable substances only as are fresh and good should be used: the waters must not then be immediately brought into the preserving vessels, neither should the essential oil, floating on the surface, be removed; and, when poured out, they should always be well agitated, and kept in stone-bottles in an airy, dry, and cool place.—*Pharm. C. B.* Oct. 1842.

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ART. X.—*Contribution to the Pharmacology of Ergot of Rye.*

M. BONJEAN, *Protopharmacien* of Chambéry, in Savoy, has lately written a treatise entitled “*Histoire Toxicologique et Médicale du seigle Ergote*,” which he presented to the Academy of Sciences at Paris.

M. Bonjean is one of those therapeutists who admit two different active principles in the ergot of rye; that is, one possessing remedial powers, and the other poisonous. The former, according to his views, is a soft extract of a reddish-brown colour, easily soluble in cold water, and possesses the very valuable properties of promoting the throes of labour, and also acts as a styptic. The poisonous principle, on the other hand, is a colourless fatty oil, very easily soluble in ether, but insoluble in boiling alcohol. Since this oil does not dissolve in water, it is easy to separate these principles from each other, which circumstance is of the highest importance in medicine, as the extract may be given in large quantities without producing those symptoms of poisoning which M. Bonjean infers are caused by the ergot of rye in the solid form. This *extractum secalis cornuti*\* acts with extraordinary rapidity, as a styptic, without producing at the same time any noxious effects. It may be given in doses of 2 drachms, corresponding to from 9 to 10 drachms of the ergot of rye; and these large dose, in cases of sudden hæmorrhage endangering the life of the mother, are found to act most admirably, instantaneously, or very nearly so, as a styptic. M. Bonjean, therefore, termed this aqueous extract of ergot of rye, “*Extractum hæmostaticum*.”

The oil of the ergot of rye acts, according to Bonjean, in the same manner as the ergot of rye itself, as a narcotic; wherefore he compares its effects to those of the morphia. In feeble beings, especially birds, the narcotic effect very quickly ensues. Thus a fowl may be lulled to sleep by 4 grammes of the oil of ergot of rye, equal to 1 drachm; corresponding scarcely to a dose of 12 grammes, = 3 drachms, of ergot of rye in powder. The animals remain in this benumbed condition for 24 hours, when they die.

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\* The preparation of this extract must be executed with rapidity, so that it may be completed in one day, because the aqueous infusion of the ergot of rye, especially if the temperature is somewhat high, decomposes very readily.—*Ed.*

A dose of 20 grammes, = 5 drachms, given to a dog, produced all the symptoms of convulsive ergotism.

In order to obtain the oil in perfection, the ergot of rye must be digested with ether at a low temperature, and any increase of temperature must also be avoided during evaporation of the ether. M. Bonjean states that the unripe ergot of rye does not yield an efficacious oil.

According to these views and observations the oil of ergot of rye is not, therefore, proper for medical use, and the aqueous extract only, which Bonjean terms "Extract hemostatique," should be employed. He recommends its application in the following formulæ:—

#### I. Potio haemostatica.

R. Extracti Haemostatici gr. vj. ; Aq. Commun. ℥ i ; Aq. Flor. Aurant. ℥j. M. D. S.  
To take it in doses of a soup spoonful. In cases of sudden and dangerous hemorrhage triple the quantity of extract may be dissolved, and  $\frac{1}{4}$  or  $\frac{1}{2}$  of the solution taken at once.

#### II. Syrupus haemostaticus.

R. Extracti haemostatici ℥j℞. ; Aq. Flor. Aurant. ℥j. ; Syr. Simpl. lb. j℞. ; f. l. a. Syr.

#### III. Pilulæ Haemostaticæ.

R. Extr. Haemostat. ℥j. ; Pulv. Rad. Althææ. q. s. ; Ut f. Pilulæ  
For one day. No. vj. S.

Among these three formulæ the mixture claims decidedly the preference, if it is necessary to obtain a rapid and powerful effect; it must not, however, be kept for any length of time since it readily ferments, and is then spoilt.

In direct opposition to the opinions of Messrs. Bonjean and Hooker, and supposing the oil of the ergot of rye to act as a narcotic only, and the extract of ergot of rye prepared with water, on the contrary, as contractive, and promoting the contractions of the uterus, acting at the same time as a styptic, such are the observations of Messrs. Wirght and John Lever. The latter lately published his experiments and observations in the *London Medical Gazette*, Vol. xxvi. p. 108.

He employs the Oleum Secalis Cornuti in combination with ether ; which combination is, according to Rees, prepared in the following manner :—Four ounces of pulverized ergot of rye are digested with four fluidounces of ether for seven days. The ether is then expelled from this extract by distillation and evaporation, and the remaining oil again dissolved in f. ℥ij. of ether. Every ounce of this solution contains the oil of two ounces of ergot of rye ; thus fifteen drops may be considered as equal to half a drachm of ergot of rye in powder. Of this solutio æthereæ J. Lever gives to the patient, when in labour, from fifteen to thirty drops on sugar ; in cases of menorrhagia, from five to eight drops three times a day : it was never necessary to give more than four or five such doses in the course of a day. If it is advisable to

avoid the ether in the application of this remedy, the piece of sugar, on which the solution is poured, has only to be exposed to a current of air for a few minutes in order to remove the ether by evaporation.

Lever states, that the unpleasant effects simultaneously produced by the ergot of rye in other forms and preparations, as nausea, headache, lowering of the pulse, enlargement of the pupil, &c. are avoided by the application of the ethereal solution.

We thus see, that the opinions and observations of different medical men, respecting the ergot of rye, are still at variance. Our former assertion, that the oil of ergot of rye seems to be a solution of Ergotine in a mild fatty oil, and that the aqueous and alcoholic extract of ergot of rye merely represent different combinations of the same active principle, is advanced more and more by the evidence adduced. The effects of the same substance may indeed be different, according to the combination and the quantity in which it is given, and according, also, to the idiosyncrasy of the individual, &c. &c.—*B. R.*

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ART. XI.—*Elementary Course of Pharmacy, chiefly from the German of P. A. Cap and Rudolph Brandes, collated with the Works of Phæbus, Soubeiran, Guibourt, Lecanu, Duflos, Gmelin, &c. &c.*

[Continued from page 332.]

§ 10. *Pharmacy in Relation to other Sciences.*—Pharmacy, as we have shewn by the preceding exposition, is, indeed, an independent science; but it is, at the same time, and in a more extended sense, a branch of the medical art as well as of practical science. It is always dependent on medical science, inasmuch as the state of the latter necessarily exerts an important influence on the store of remedies. A comparison of the Dispensatories and Pharmacopœias of different countries fully proves what we now advance. This dependence is, however, mutual, in so far as pharmacy is continually progressing towards perfection; and not merely is it always improving the medical art, but also furnishes new and more appropriate remedies.

Pharmacy is a part of the practical natural sciences, because the remedies, being natural bodies—a precise knowledge of which is based on the characters and properties of bodies which natural history brings under our notice—and because the laws, under whose guidance pharmacy executes many of its varied tasks, are derived from natural philosophy, physics, and chemistry. The more justly it avails itself of these laws, the more perfect is pharmacy in its practical application, and the more it furnishes remedies in a state capable of satisfying the expectations anticipated from them; that is to say, in the highest possible state of perfection. This, however, should be the first aim

of the chymist and druggist: to this he should direct his utmost exertions.

By the separation of the medical art into different branches, each of these branches has acquired that independence to which the great improvement attained by all may be fairly ascribed. After this separation, the pharmacist was able to devote his talents wholly to the studies of his vocation, and to employ the results of such study in its further development. The history of pharmacy furnishes honourable testimony as to the extent chymists and druggists have fulfilled, and daily fulfil, their worthy and important mission, so that, as before pointed out, pharmacy itself has, on her part, again become a school for the natural sciences, and an ever-teeming source of new amplifications and discoveries in its peculiar field of research. The peculiar position of druggists, the continual attention which their vocation requires, the mental activity and manual dexterity which it claims, the seclusion which their important calling demands from the busy scenes of the world, and the thirst for investigation—all these circumstances combined, powerfully assist in rendering the pharmaceutical career an introductory school to the cultivation of the more abstruse natural sciences, and the manifold operations connected with them. With such truly comprehensive and scientific appliances, and a faithful fulfilment of the duties of his vocation, the chymist works hand in hand with the physician for the attainment of the beneficent aim of medical science. However distinct medicine and pharmacy may be in their application to attain this the one aim, there is still an unity which brings them into the closest collision. It is the task of the young man who devotes himself to pharmacy to thoroughly understand the importance of this noble aim, and to make it a spur to the advancement of himself by the exertion of all his abilities in this his vocation.

§ 11. A pharmaceutical apprenticeship may include the three following divisions:—

1. *The Preparatory Studies*, or those which lay the foundation of a good general education—ancient and modern languages, history, geography, mathematics, the elements of physical science, natural history, and philosophy.

2. *Pharmacy, in the closer acceptation of the term*, or the practical operations required for the preparation of remedies, and illustrated by the most important phenomena accompanying these operations. This knowledge can only be gained in its full extent by going through all the different grades of the duties of the shop, and the work to be executed in the laboratory. This, termed the apprenticeship, is the only school in which the pupil can acquire a perfect knowledge of the numerous details of which this part of his art is made up; and, in order to perfect himself



therein, he must devote himself fully to its acquirement by continually-repeated exercise.

3. *Theoretical Acquirements*.—These are attained by the regular study both of all parts of natural history and the facts made known by chymistry and physics. This complicity of knowledge, as well as the practice of executing the finer chymical manipulations, can only be acquired by methodical instruction in proper establishments.

[To be continued.]

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#### ART. XII.—*The prevailing Murrain among Cattle.*

WE understand that the following recipe has been tried with perfect success in Korunagalla, viz. a small piece of lard the size of a walnut given to each bullock, cow, &c. As the recipe is of so simple a nature, and within the reach of all classes of persons, we trust it will be extensively tried; and we shall have much pleasure in giving insertion to any communications from our readers on this really important subject.

[We extract the above from the *Ceylon Miscellany*, conducted by E. R. Power, Esq. and published quarterly. We are glad to perceive in the same number the Prospectus of the Ceylon Agricultural Society, under the patronage of the Governor and Commander-in-Chief, the Hon. Sir Colin Campbell, K.C.B. &c.—ED. A.C.]

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#### ART. XIII.—*On the Sale and Preparation of Drugs.*

*To the Editors of the Annals of Chymistry and Pharmacy.*

GENTLEMEN,—It is with much satisfaction I observe that medical as well as chymical and pharmaceutical journalists are beginning to concur in opinion as to the necessity of advocating a system of protection on behalf of chymists and druggists, with respect to the sale and preparation of drugs for medicinal purposes. The evil of a competition in the supply of medicine is, that it has a tendency to deteriorate quality, inasmuch as, we always find that the competition is in respect to *price* rather than the *purity* of drugs. It has justly been considered by continental pharmaciens an opprobrium both to the government and the professors of pharmacy in Great Britain, that the art should have been left, up to the present time, without due regulations, as to the qualification, protection, and distinction of those who practise it, being enforced.

The chymist and druggist, who is the legitimate apothecary or pharmacist of England, should in future be recognized as belonging to the fraternity of professional men, being, in fact, the professor of a highly honourable and useful art, which, if practically and scientifically pursued,

must place him on a footing with other branches of the medical profession, inasmuch as that his occupation, independent of his learning and acquirements, equally tends towards the mitigation of "the ills that flesh is heir to."

Many of the regulations contained in the medical charter conferred by King Roger, of Naples, and referred to in the historical sketch given in your admirable journal, might be enforced with considerable advantage, both to the community and the profession, in the nineteenth century, especially those relating to prices and the number of drug establishments, and lastly, though by no means the least important, the prohibition of physicians from being the proprietors of *shops or open dispensaries*, or entering into any contract whatever with the druggist or apothecary to his own advantage and the prejudice of the public. In conclusion I would remark, that these provisions should be strongly urged upon the Council of the Pharmaceutical Society, and should be taken by that body into serious consideration, with a view to rendering the same, or similar precautions, compulsory on the profession generally, even in this present age, and which may be probably easily effected through the instrumentality of Sir James Graham's Bill for the better Regulation of the Medical Profession, which I understand is to be introduced early in the ensuing session.—Gentlemen, yours very respectfully,

PHARMACOPOLA.

Dec. 16, 1842.

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#### ART. XIV.—*Use of Cocculus Indicus.*

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*To the Editors of the Annals of Chymistry and Pharmacy.*

GENTLEMEN,—In reply to the communication of Medicus in your last, I take leave to offer a few observations on the Cocculus Indicus.

Although I have carefully looked over the returns of imports every year, I have never been able to discover for some time past any notice of the quantity of the drug annually imported. Dr. Pereira, in his *Materia Medica*, states that he found, from a druggist's private books only, 2500 bags were entered in the year 1834; but this information is indefinite, as the weight of each bag is not stated. In 1832, the importation was 12,000 lbs. Of this there is a small quantity used by poachers, and to destroy vermin; by far the greater part being required for adulterating beer. This is no secret. A writer on Brewing, a Mr. Childe, states that with pure malt and hops it is impossible to produce a strong-bodied porter, and, therefore, he recommends the use of Cocculus Indicus, Grains of Paradise, and Nux Vomica. Another author—Morrice, (*Treatise on Brewing*)—gives full directions for its use. He directs three pounds of Cocculus Indicus to be added to every ten quarters of malt; and he adds, "it gives an inebriating quality which passes for strength of liquor; and

it prevents second fermentation in bottled beer, and, consequently, the bursting of the bottles in warm climates."

Notwithstanding the use of this drug being prohibited under a penalty of £200 upon the brewer, and £500 upon the seller, it is still very extensively employed; but, in order to preclude the possibility of detection, the brewers' druggists sell a watery extract of it under the title of *black extract*. This black extract is ostensibly prepared for tanners; but its real object is for the adulteration of beer.

I doubt not that your correspondent Medicus is aware that, in addition to this, a vast number of other drugs are likewise employed in brewing. So long back as 1814, Accum gave a long list of these sophistications in his "Treatise on the Adulterations of Food."—Yours obediently,

G. T. F.

Dec. 19, 1842.

## GALVANISM AND ELECTRICITY.

### ART. XV.—*On Galvanography.* By JACOBI.

[From a Report to the Academy of Sciences at St. Petersburg, *Bullet. Scientif. x.* No. 6.]

[Concluded from page 387.]

THE first impulse being thus given to the cultivation of galvanography, it was fair to infer that clever draughtsmen, and other artists, should occupy themselves with this new art, diligently striving to improve and to master its details as much as possible. I am, therefore, happy in being able to place before this Academy, whose members have pursued the improvement of galvanoplastics from the first commencement with so much interest, some galvanographs which completely justify the expectations of which first experiments gave promise. The impressions produced, and for which I am indebted to the kindness of his Highness the Danish ambassador at this Court (St. Petersburg), are impressions of copperplates executed by Captain Hoffmann, of the royal Danish artillery, according to the method above described, and which, for sharpness and purity of outline, completely satisfy all claims which might with justice be made on a linear drawing, executed with the pen, or by lithography.

The ink which Captain Hoffmann employed, being an object of considerable importance for their execution, is at present unknown. It is, however, obvious from the impressions, that this ink must possess many properties, adapted for linear drawings, which are wanting in the materials hitherto employed—which latter approach rather to drawings with Indian ink. Mr. Hoffmann states in this respect, that he succeeded last spring, after many trials, in discovering a substance which flows so well from the pen, that it is possible to draw and write with it on paper as

nicely as Indian ink. The inventor mentions the following advantages which distinguish this process from the common engravings on copper and from lithography :—

1stly, That it is not necessary to draw or to write the reverse of the impression to be produced ; and, therefore, any draughtsman may be employed for these drawings : and it is obvious that he surpasses the copperplate engraver in precisely the same proportion as he himself may be superior as a draughtsman or penman, for the impressions are a perfect image of his work.

2dly, That the transferring of the drawing on copper is effected in much less time, and, therefore, at a greatly diminished expense.

3dly, That any error in the drawing may be corrected with the greatest facility, without the plate suffering in the slightest degree ; which, of course, has a very favourable effect on the equanimity of the draughtsman.

If we may infer from objects on which Captain Hoffmann has hitherto employed his method of galvanography, it seems especially fitted for calligraphic, topographic, and architectural works.

From these remarks, and the appreciation which the inventor of this peculiar galvanographic ink has already found in his own country, it does not seem probable that the engraver's chisel has lent any assistance to the plates here produced ; and it may likewise be presumed, that no peculiar skill besides that of a draughtsman, or any peculiar and intricate preparations, are required for putting this method into practice. Although in works of the higher art the engraver's chisel may not easily be replaced by it, the range of drawings above pointed out has a greater extent, and occupies the abilities of a great many individuals. Our Academy, too, takes a lively interest in these researches ; since, in future, it will not be necessary, in publishing works containing designs or maps of this kind, to be afraid of the enormous expense of copperplate engravings. I shall only remind the present members, of the drawing of the instruments of the observatory of Pulkowa, the copperplates of which, executed in this way, might doubtless be considerably cheaper than has been possible hitherto, and at the same time in equal perfection.

The oriental members of our Academy are already obliged to prepare their manuscripts with more neatness and accuracy for the printer than we are required to do. In future it will, perhaps, only be requisite for them to write on copper, in order to obtain engraved plates for little more than the expense of the material. In the department of public education there are also, I believe, several works in preparation requiring the engraver's burin, which perhaps might be replaced by the method of Captain Hoffmann.—*Journ. f. pr. Chemie*, Nov. 1842.

| NOMINA.                          | FORMULÆ.                            |
|----------------------------------|-------------------------------------|
| <i>Bromas</i> Cuprosus . . . . . | $\text{Cu}_2 \text{Br}_2$ . . . . . |
| — Ferricus . . . . .             | $\text{Fe}_2 \text{Br}_2$ . . . . . |
|                                  | $\frac{1}{2}$ . . . . .             |
| — Ferrosus . . . . .             | $\text{Fe} \text{Br}_2$ . . . . .   |
| — Gluciniçus . . . . .           | $\text{G}_2 \text{Br}_2$ . . . . .  |
|                                  | $\frac{1}{2}$ . . . . .             |
| — Hydrargyricus . . . . .        | $\text{Hg} \text{Br}_2$ . . . . .   |
| — Hydrargyrosus . . . . .        | $\text{Hg}_2 \text{Br}_2$ . . . . . |
| — Kalicus . . . . .              | $\text{K} \text{Br}$ . . . . .      |
| — Lithicus . . . . .             | $\text{L} \text{Br}_2$ . . . . .    |
| — Magnesicus . . . . .           | $\text{Mg} \text{Br}_2$ . . . . .   |
| — Manganosus . . . . .           | $\text{Mn} \text{Br}_2$ . . . . .   |
| — Molybdicus . . . . .           | $\text{Mo} \text{Br}_2$ . . . . .   |
|                                  | $\frac{1}{2}$ . . . . .             |
| — Molybdosus . . . . .           | $\text{Mo} \text{Br}_2$ . . . . .   |
| — Natricus . . . . .             | $\text{Na} \text{Br}$ . . . . .     |
| — Niccolicus . . . . .           | $\text{Ni} \text{Br}_2$ . . . . .   |
| — Palladosus . . . . .           | $\text{Pd} \text{Br}_2$ . . . . .   |
| — Platinicus . . . . .           | $\text{Pt} \text{Br}_2$ . . . . .   |
|                                  | $\frac{1}{2}$ . . . . .             |
| — Platinosus . . . . .           | $\text{Pt} \text{Br}_2$ . . . . .   |
| — Plumbicus . . . . .            | $\text{Pb} \text{Br}_2$ . . . . .   |
| — Rhodicus . . . . .             | $\text{R}_2 \text{Br}_2$ . . . . .  |
|                                  | $\frac{1}{2}$ . . . . .             |
| — Stannicus . . . . .            | $\text{Sn} \text{Br}_2$ . . . . .   |
|                                  | $\frac{1}{2}$ . . . . .             |
| — Stannosus . . . . .            | $\text{Sn} \text{Br}_2$ . . . . .   |

| PONDERA ATOMORUM. |                    | PARTES CENTESIMALES. |       |                      |
|-------------------|--------------------|----------------------|-------|----------------------|
| O = 100           | H <sub>+</sub> = 1 | + E                  | —E    | H vel H <sub>+</sub> |
| 2369,70           | 189,89             | 37,62                | 62,38 |                      |
| 5413,33           | 433,77             | 18,07                | 81,93 |                      |
| 1804,44           | 144,59             |                      |       |                      |
| 1917,51           | 153,65             | 22,90                | 77,10 |                      |
| 5397,44           | 432,50             | 17,83                | 82,17 |                      |
| 1799,15           | 144,17             |                      |       |                      |
| 2844,13           | 227,90             | 48,02                | 51,98 |                      |
| 4109,95           | 329,33             | 64,03                | 35,97 |                      |
| 2068,22           | 165,73             | 28,52                | 71,48 |                      |
| 1658,64           | 132,91             | 10,87                | 89,13 |                      |
| 1736,66           | 139,16             | 14,88                | 85,12 |                      |
| 1924,19           | 154,19             | 23,17                | 76,83 |                      |
| 3755,13           | 300,90             | 21,26                | 78,74 |                      |
| 1877,57           | 150,45             |                      |       |                      |
| 2176,83           | 174,44             | 32,09                | 67,91 |                      |
| 1869,20           | 149,78             | 20,91                | 79,09 |                      |
| 1947,98           | 156,09             | 24,11                | 75,89 |                      |
| 2244,21           | 179,83             | 34,13                | 65,87 |                      |
| 4390,11           | 351,78             | 32,65                | 67,35 |                      |
| 2195,06           | 175,89             |                      |       |                      |
| 2811,81           | 225,31             | 47,43                | 52,57 |                      |
| 2872,80           | 230,20             | 48,54                | 51,46 |                      |
| 6037,69           | 483,81             | 26,55                | 73,45 |                      |
| 2012,56           | 161,27             |                      |       |                      |
| 3891,91           | 311,86             | 24,03                | 75,97 |                      |
| 1945,95           | 155,93             |                      |       |                      |
| 2313,60           | 185,39             | 36,10                | 63,90 |                      |

| NOMINA.                              | FORMULÆ.                                      |
|--------------------------------------|-----------------------------------------------|
| <i>Bromas</i> Stibicus . . . . .     | $\text{Sb}_2 \text{Br}_3$ . . . . .           |
| — Stronticus . . . . .               | $\frac{1}{2}$ . . . . .                       |
| — Telluricus . . . . .               | $\text{Sr} \text{Br}_2$ . . . . .             |
| — Thoricus . . . . .                 | $\text{Te} \text{Br}_4$ . . . . .             |
| — Uranicus . . . . .                 | $\frac{1}{2}$ . . . . .                       |
| — Uranosus . . . . .                 | $\text{Th} \text{Br}_4$ . . . . .             |
| — Yttricus . . . . .                 | $\text{U} \text{Br}_3$ . . . . .              |
| — Zincicus . . . . .                 | $\frac{1}{2}$ . . . . .                       |
| — Zirconicus . . . . .               | $\text{U} \text{Br}_4$ . . . . .              |
|                                      | $\text{Y} \text{Br}_3$ . . . . .              |
|                                      | $\text{Zn} \text{Br}_2$ . . . . .             |
|                                      | $\text{Zr}_2 \text{Br}_3$ . . . . .           |
|                                      | $\frac{1}{2}$ . . . . .                       |
| <i>Brometum</i> Aluminicum . . . . . | $\text{Al}_2 \text{Br}_3$ . . . . .           |
| — Amonicum . . . . .                 | $\frac{1}{2}$ . . . . .                       |
| — Argenticum . . . . .               | $\text{N}_2 \text{H}_4 \text{Br}_2$ . . . . . |
| — Autricum . . . . .                 | $\text{Ag} \text{Br}_2$ . . . . .             |
| — Aurosum . . . . .                  | $\text{Au}_2 \text{Br}_3$ . . . . .           |
| — Baryticum . . . . .                | $\text{Ba} \text{Br}_2$ . . . . .             |
| — Benzoylicum . . . . .              | $\text{Bz} \text{Br}_2$ . . . . .             |
| — Bismuthicum . . . . .              | $\text{Bi} \text{Br}_3$ . . . . .             |
| — Cadmicum . . . . .                 | $\text{Cd} \text{Br}_2$ . . . . .             |
| — Calcicum . . . . .                 | $\text{Ca} \text{Br}_2$ . . . . .             |
| — Cericum . . . . .                  | $\text{Ce}_2 \text{Br}_3$ . . . . .           |
|                                      | $\frac{1}{2}$ . . . . .                       |

| PONDERA ATOMORUM. |                    | PARTES CENTESIMALES. |       |                      |
|-------------------|--------------------|----------------------|-------|----------------------|
| O = 100           | H <sub>2</sub> = 1 | + E                  | — E   | H vel H <sub>2</sub> |
| 6347,82           | 508,66             | 30,13                | 69,87 |                      |
| 2115,94           | 169,55             |                      |       |                      |
| 2125,59           | 170,33             | 30,45                | 69,55 |                      |
| 3958,38           | 317,19             | 25,31                | 74,69 |                      |
| 1979,19           | 158,59             |                      |       |                      |
| 2923,21           | 186,16             | 36,37                | 63,63 |                      |
| 10157,63          | 813,94             | 56,34                | 43,66 |                      |
| 3385,88           | 271,31             |                      |       |                      |
| 4289,66           | 343,73             | 65,54                | 34,46 |                      |
| 1980,82           | 158,73             | 25,37                | 74,63 |                      |
| 1981,53           | 158,78             | 25,40                | 74,60 |                      |
| 5575,32           | 446,76             | 20,45                | 79,55 |                      |
| 1858,44           | 148,92             |                      |       |                      |
| 3277,25           | 262,61             | 10,45                | 89,55 |                      |
| 1092,42           | 87,54              |                      |       |                      |
| 1205,26           | 96,58              | 18,83                | 81,17 |                      |
| 2329,91           | 186,70             | 58,01                | 41,99 |                      |
| 5420,94           | 434,39             | 45,86                | 54,14 |                      |
| 1806,98           | 144,80             |                      |       |                      |
| 3464,33           | 276,96             | 71,76                | 28,24 |                      |
| 1835,19           | 147,06             | 46,69                | 53,31 |                      |
| 2310,83           | 185,17             | 57,66                | 42,34 |                      |
| 1865,22           | 149,46             | 47,55                | 52,45 |                      |
| 1675,07           | 134,23             | 41,60                | 58,40 |                      |
| 1234,33           | 98,91              | 20,74                | 79,26 |                      |
| 4084,31           | 327,28             | 28,14                | 71,86 |                      |
| 1361,44           | 109,09             |                      |       |                      |



## A CASE FOR CHYMISTS.

THE Cour Royale of Rennes was, on the 30th ult. and the 1st and 7th inst. engaged in hearing an appeal against a judgment of the Correctional Tribunal of St Malo, under the following extraordinary circumstances :—On March 30, a M. Lessechop died suddenly, with all the symptoms of having been poisoned. As he had been lately dismissed from an employment which he held under the Ponts-et-Chaussées on the works going on at the floating-docks of that port, it was at first attributed to an act of suicide from chagrin. Very soon afterwards, however, a report got about that his death was occasioned by a medicament imprudently administered to him by M. Macé, a physician who had been settled at St. Malo about twelve months. An inquest was taken, upon which M. Macé was brought before the Correctional Tribunal, and sentenced to pay a fine, as being convicted of involuntary homicide. Against this decision the public prosecutor and M. Macé both appealed. On this new trial the facts were more minutely gone into, and, according to the testimony and pleadings, appeared to be as follows :—On March 9, M. Macé took to M. Piel, a chymist, a prescription for M. Lessechop, of four grammes (= sixty-one grains) of cyanuret of mercury, to be made up into twelve pills. On observation made by the chymist as to the powerful effects of this preparation, M. Macé at first substituted cyanuret of potassium, and afterwards ioduret of potassium, for the cyanuret of mercury. On the 29th of March the physician went again to the chymist with a prescription of four grammes (= sixty-one grains) of cyanuret of potassium, to be dissolved in sixty grammes of orange-flower-water (two ounces), and fifteen grammes (two drachms) of syrup; one spoonful of which was to be taken three times a day. The patient took but one spoonful; for he expired in three-quarters of an hour after having swallowed it. On an autopsy being taken, the entrails exhibited symptoms of organic disease, which tended to shorten life, but could not have caused death so sudden. No trace of the cyanuret of potassium could be found in the body; but it was evident that one spoonful of the mixture had been taken out of the bottle; and three eminent chymists, to whom the remainder had been submitted, deposed that the cyanuret contained in it was chymically perfect; that several strong and healthy animals, to which a quantity equal to that taken by M. Lessechop had been given, mixed with food, died almost immediately afterwards, and therefore it was to be inferred that the death of the patient of M. Macé was occasioned by the medicament administered to him. The accused party endeavoured to repel the charge against him by asserting that the deceased, who had himself studied medicine, had suggested the use of cyanuret of potassium; and further, that the quantity intended to be taken at a time was only a tea-spoonful, whereas M. Lessechop had swallowed a table-spoonful. He added, that he had also ordered that each spoonful should be taken in a cup of milk—a direction which had not been followed. To this last point it was replied, that milk newly drawn from the cow is alkaline, and could not either have increased or diminished the poisonous quality of the cyanuret of potassium; that soon after milk is in contact with the air, it undergoes lactic fermentation, and becomes acid. In this state it may have some of its cyanhydric acid (hydrocyanic acid) displaced by the lactic acid, and then would form, in one case, lactate of potassium, and, in the other, a certain quantity of cyanhydric acid, which would remain in the milk, the action of which acid would be as powerful as the cyanuret of potassium. If the milk be boiled, the cyanhydric acid (hydrocyanic acid) would evaporate, and the poisonous action be greatly lessened. To questions put by the president, the chymists stated that the cyanuret of mercury first prescribed by M. Macé was a less violent poison than the cyanuret of potassium which he first substituted for it, and much less than the ioduret of potassium. The Cour Royale confirmed the judgment of the Correctional Tribunal, but changed the penalties into a fine of 50*fr.* with three months' imprisonment, and an additional twelve months on non-payment of the fine and the costs of the prosecution.—*Galignani's Messenger*.

[We have some remarks in type relative to the above, but are compelled by want of space to defer them until next week.—ED. A. C.]

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\* \* \* *Communications, Books for Review, &c. are requested to be addressed*—“To the Editors of the ANNALS OF CHYMISTRY, care of Messrs. Longman, Brown, and Co. Paternoster Row.”

WILSON AND OGILVY, 57, SKINNER STREET, SNOWHILL, LONDON.

THE  
ANNALS OF CHYMISTRY  
AND  
PRACTICAL PHARMACY.

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No. 14.] FRIDAY, DECEMBER 30, 1842. [VOL. I.

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PHARMACEUTICAL NOMENCLATURE.

CAMDEN tells a story of a priest in the reign of HENRY VI. who, whenever the word *sumpsimus* occurred in his breviary, was accustomed to read *mumpsimus* instead. As literature revived, his mistake began to offend the ears of his auditors; but he always answered their corrections by observing that he had read it so for thirty years, and did not intend to change his old-fashioned *mumpsimus* for their new-fangled *sumpsimus*. Just so it is with nomenclature; after a time the bump of memory seems to lose its sensibility; it refuses to register new facts, and even the man of science clings to the terms minted in his youth, and scarcely recollects the nomenclature of LIEBIG and DUMAS. But this reluctance to admit new names, however it may be pardoned in the grey-headed practitioner secure in the approbation of Grosvenor Square, or even in the opulent druggist conscious of Bank Stock and India Bonds, will be out of costume for him who has his battle still to fight.

The young chymist must either have reached the acme of luxurious indolence, or he must have mingled but little with the world, if he imagines that men of science will listen to his prayer, and keep names fixed, when the theories on which they depend have changed.

The term *chymist*, as every one knows, comprehends several distinct classes of men. The most numerous one sells drugs retail, the profit on which is considerable, not only because the quantity sold at one time is small, but because the education and skill of the venders are far superior to the mere readiness required for common trades.

Another class (to which belong a LIEBIG, a FARADAY, a  
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DALTON, and a GREGORY,) investigates the nature and properties of matter. This chymists do, nine hundred and ninety-nine times out of a thousand, not for profit, but for honour. They neither bury their discoveries under a bushel, nor confine them within the iron limits of a patent, but freely communicate them; for they think that truth, like light, should be common to all!

To assist the memory, and give unity to scattered data, these discoverers suggest a system, or start an hypothesis, as a connecting link for the facts observed. They thus facilitate comprehension, and bring philosophy, as SOCRATES boasted that he had done, from the clouds to the earth.

The least, therefore, that the ordinary chymist can do, is to learn the language of these teachers of his art. To wish otherwise, is to wish to bring down our profession to the level of the sluggish; be our lot rather cast with those who would raise it into the sphere of loftier spirits, who breathe life into all which they discuss. It is they who give our profession "a local habitation and a name," and who confer on the trader in drugs a station so far above those who deal in ordinary commodities.

The rise of the druggist into his present respectable position depends, no doubt, in part, on the division of labour, and the confidence which it engenders in the public. The druggist is esteemed, because he has leisure to do well what he does; while it is shrewdly suspected that the apothecary, distracted by multifarious occupations, takes the goodness of his medicines on trust, and expects his customers to do the same.

With his attention directed to but few objects, it is expected that the chymist's acquaintance with their forms, properties, and nomenclature, shall be most intimate. Though chained to the counter for twelve or fourteen hours a day, a large portion of this time is unoccupied. Is it too much, then, to demand, that he should make himself acquainted with those theories which are stamped with the sanction of the highest names in chymistry? Is he to be allowed to plead that the prefix *bi* is insufficient to distinguish a remedy? As well might the school-boy urge that the prefix *un* does not sufficiently mark a negative!

Let us, then, entreat those who have neglected to learn these necessary details of our profession, not to endeavour to lower it to their own temporary level, but to endeavour to rise to an ideal

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Fig 7

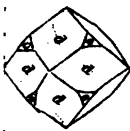


Fig 8

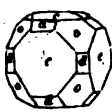


Fig 9

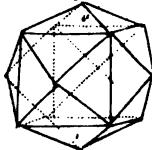


Fig 10

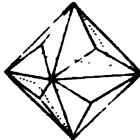


Fig 17

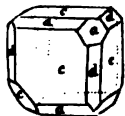


Fig 18



Fig 19



Fig 20



Fig 27

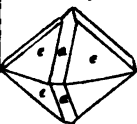


Fig 28

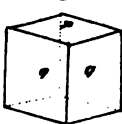


Fig 29

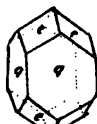


Fig 30



Fig 37



Fig 38



Fig 39

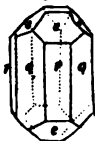


Fig 40



Fig 47

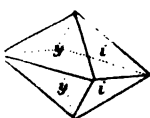


Fig 48



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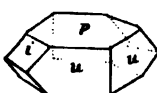


Fig 50

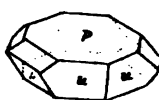


Fig 57

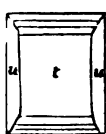


Fig 58

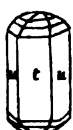


Fig 59

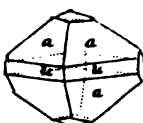


Fig 60



Fig 67

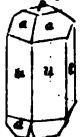


Fig 68



Fig 69

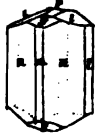


Fig 70

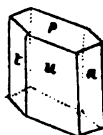


Fig 77



Fig 78

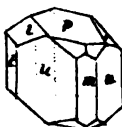


Fig 79



Fig 80



standard. In their new position, among the aristocracy of knowledge, they will stand securely, far better defended by the heights which they have attained, than by the rank which parchments can confer.

While medical journals, advocating the cause of the harassed practitioner, would still adhere to the old names, we must be allowed to take a course more congenial to the true interests of those whom we support, and by whom we are supported. The medical factotum of a large district may start back from a cluster of new terms, like a man, who, as HOMER says, in the hollow of a valley, has trodden on a serpent; but the scientific chymist, urged on by zeal, and not destitute of leisure, will hail the discoveries of the master-spirits of the age, and will consider nomenclature merely as the channel of the knowledge which he loves.

These views may appear troublesome to the votaries of ease and pleasure, but if founded on truth, as we trust they are, they must and will be generally adopted.

We would entreat all who have the good of our profession at heart, to forget their jealous rivalry, and waive, for the present at least, their hostile pretensions. Let this generous policy be pursued, and the best results may be hoped for. It would be scarcely too much to anticipate that ere long, in our principal towns, every remedy would pass over the counter of the chymist and druggist ere it reached the lips of the patient.

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## CHYMISTRY, OPERATIVE AND EXPERIMENTAL.

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### ART. II.—*On Crystallization.*

IN order to effect the crystallization of a substance, it must first be converted either into a state of aqueous or gaseous mobility, as by increasing the temperature, during which operation the substance is fused (*e. g.* sulphur, bismuth,) or sublimed, (*sal ammoniac, iodine,*) or by allowing one substance to enter into chymical combination with another, which is of aqueous or gaseous fluidity at common or perhaps somewhat increased temperature, (*e. g.* salts in water, sulphur in sulphuret of carbon, sulphate of barytes in vitriol, camphor, benzoic acid, &c., in spirit of wine, iodine in hydrogen, forming hydrodic acid gas.) The same cause which first imparted a state of fluidity to the substance must then be removed.

I. If heat be the only cause producing fluidity, or if at any rate it assists in dissolving the solid substance to an increased extent in any liquor, the temperature must be lowered. In order to obtain crystals from a mass in fusion, *e. g.* sulphur, metals, they are allowed to solidify only partially, when the parts remaining fluid are decanted, because these latter would otherwise form an amorphous mass with the crystals produced at the commencement of the cooling. The vapours of sulphur, iodine, sal ammoniac, are conducted to a cooled part of the apparatus, where they are deposited in crystals. A solution of different salts in water, produced by the action of increased temperature, of sulphur in sulphuret of carbon, of camphor, &c. in spirit of wine, deposits on cooling those parts of the solid body, in a crystalline state, which cannot be held in solution at the lower temperature. During the cooling of some aqueous liquids, the anomalous phenomenon is frequently observed, that if left undisturbed and in covered or closed vessels, they descend far beneath that degree of temperature at which they would yield crystals under other circumstances, and this without relinquishing the liquid state, until any movement, or the introduction of solid bodies, &c., causes them suddenly to assume the crystalline form. This takes place in the following cases:—Whilst water solidifies in open vessels, being at the same time slightly disturbed at  $0^{\circ}\text{C.} = 32^{\circ}\text{F.}$ , forming a crystalline mass: in closed bottles, or in the ball of a thermometer, it has frequently been lowered to  $6^{\circ}\text{C.} = 21^{\circ}\text{F.}$  without consolidating, and only by movement or opening of the vessel, or throwing a piece of ice into the water, when crystallization quickly ensues, radiating from one or more points, whilst at the same time the temperature of the water rises to  $0^{\circ} = 32^{\circ}\text{F.}$  The phenomenon of fogs forming above lakes at the moment of congelation may perhaps arise from this cause. Pure phosphorus, fused in a basin under warm water, remains liquid through the night at  $4.5^{\circ} = 40^{\circ}\text{F.}$ , but solidifies when poured out on the hand.—CLARK, (*Ed. J. of Sc.* 7., 381.) Phosphorus boiled with a ley of potassa remains mixed at ordinary temperature some times for months in a liquid state, and consolidates when touched with a dry and solid body.—(POGGENDORFF.) Sublimed sulphur, fused in small drops, remains during the night, and at ordinary temperatures, in a liquid state, and solidifies when touched with any solid body.—(FARADAY, *Quart. J. of Sc.*, 21, 392; also POGGENDORFF, 7, 240.) Sulphur precipitated by water from chloride of sulphur, remains fluid whilst mixed with it, but consolidates instantly when exposed to the air.—(POGGENDORFF, 7, 241.) Glacial acetic acid, which consolidates in open vessels at  $16^{\circ}\text{C.} = 60^{\circ}\text{F.}$ , may be cooled in closed vessels to  $12^{\circ} = 53.6^{\circ}\text{F.}$ , and does not consolidate even if agitated; by opening the vessel, however, and agitating it, the crystallization takes place, commencing from above,

and extending throughout the whole mass at a temperature of  $15^{\circ} = 59^{\circ}\text{F.}$ , even if the surrounding air is at a higher temperature than the glacial acetic acid. LOWITZ (*Crell's Ann.*, 1790, 1, 209), and GEIGER (*Schw.*, 15, 64). Oil of anniseed, if cooled in a closed vessel, undisturbed, frequently solidifies only after agitation, and then instantly; BUCHNER (*Repert.* 15, 64). Scheererite sometimes remains, after fusion, for several days, and at ordinary temperatures, in a fluid state, and crystallizes instantly when touched with a platina-wire or glass-rod; STROMEYER (*Kastn. Arch.*, 10, 114).

Many salts, if dissolved in hot water, show the same anomalous phenomenon, especially sulphate of soda. A hot solution, prepared from equal parts of water and crystallized Glauber's salt, (sulphate of soda, with 10 atoms of water of crystallization) does not crystallize if slowly cooled, or by quickly plunging it in cold water, if contained in a barometer tube previously boiled, or in a well-closed vessel in vacuo, or in an open vessel spread over with a layer of turpentine (GAY-LUSSAC), or in a vessel containing air well closed, or even when only loosely covered with a lid, (SCHWREIGER), or in an open vessel under a bell containing air, and closed by water, or in open bottles undisturbed, or in a small and open glass placed in a closed bottle, and which bottle contains some potash, in order to dry the air therein; under which circumstances Glauber's salt effloresces by the influence of the air, not even crystallizing if rinsed down, but is dissolved, (ZIZ.)—The crystallization of a solution cooled in this way is sometimes produced immediately, at others after a short time has elapsed. (1.) By movement, that is to say if the solution was cooled in an open vessel. (2.) By admission of the air, as by opening the vessels, when crystallization ensues the more rapidly in proportion to the size of the opening, while at the same time a slight movement seems to be requisite. The crystallization commences in this case from above, where the solution, the air, and the vessel, are in contact with each other, and only a little beneath the surface, provided a grain of dust falls into the liquor when opened. In a solution cooled in vacuo, a small bubble of air, hydrogen, carbonic acid, or nitrogen, is sufficient to cause crystallization (GAY-LUSSAC.) (3.) By touching the solution with a solid body (glass-rod, flint, iron-wire, a crystal of Glauber's salt, a small grain of dust floating in the air.) These bodies do not produce crystallization if cooled with the hot solution, nor (the crystal of Glauber's salt excepted) if they are put into the solution after being previously wetted or heated, (ZIZ.) Crystallization in this case commences from the foreign substance. If a solution of 8 parts of Glauber's salt in 9 parts of boiling water is allowed to crystallize, and the whole is then heated in a retort to from  $50$  to  $55^{\circ}\text{C.} = 122$  to  $131^{\circ}\text{F.}$ , until 1-32 of the crystals is left undissolved, and the closed bottle then cooled, frequently no crystallization is produced by the crys-



talline mass still present, but this, on the contrary, is still further and entirely dissolved, at a slow rate, by inclining the retort in a manner that it is brought into contact with the superabundant liquor, and still quicker by agitation, which, however, produces also crystallization. If, on the contrary, the solution obtained at from  $50$  to  $55^{\circ}=122$  to  $131^{\circ}\text{F.}$ , is decanted from the 1-32 of the crystals, and allowed to crystallize in a basin, the remaining mother-liquor, added to the 1-32, does not dissolve it. Two solutions at least may therefore be distinguished:—1st. The *saturated*—that is so say, that liquor which remains behind after the salt present in excess has formed into crystals from a boiling solution in an open vessel; and, 2dly, the *super-saturated*—that is to say, the solution saturated at a higher temperature, and then cooled in closed vessels: this is capable of dissolving still more salt, but it deposits at a lower temperature crystals of sulphate of soda, containing 1 atom of salt with 8 atoms of water (H. OGDEN.) A solution of 2 parts of Glauber's salt in 1 part of boiling water yields, on cooling in closed vessels, hard and transparent crystals of sulphate of soda, consisting of 1 atom of salt with 8 atoms of water, which, if the supernatant liquor be caused to crystallize by one of the above-mentioned means, instantly becomes opaque (COXE and ZIZ.) If 51 parts of crystallized Glauber's salt are dissolved in 49 parts of warm water, and then, after being cooled to below  $10^{\circ}\text{C.}=50^{\circ}\text{F.}$ , are caused to crystallize suddenly by one of the means mentioned, nearly two-thirds of the Glauber's salt assume the crystalline form, and an increase of  $13^{\circ}\text{C.}=23^{\circ}\text{F.}$  occurs at the same time. THOMSON infers this increase of temperature as arising from the conversion of liquid water into solid water of crystallization, which agrees pretty well with the calculation: the evolution of heat from the passing of the fluid salt into solid, must, however, also be taken into account (GMELIN.) The statement of THENARD (*Schw.* 15, 257,) that after crystallization ensuing in this manner, a mother-liquor is left behind, which is not saturated with salt at the temperature indicated, seems to be based on error. THOMSON found, on the contrary, that the remaining liquor, according as its temperature is increased, contains a corresponding quantity of Glauber's salt in solution, a great part of which still forms into crystals on cooling to the former point of  $10^{\circ}\text{C.}=50^{\circ}\text{F.}$

A hot and concentrated solution of muriate of potassa, if cooled in a closed bottle, crystallizes when agitated, without requiring the vessel to be opened. Meanwhile it assumes a considerable higher temperature (COXE.) It does not crystallize on the addition of a few drops of oil of vitriol, or of oxalate of ammonia, and agitating, but if cold water be poured over it, or by passing a current of dry air over it (OGDEN.) A solution of 1 part of crystallized carbonate of soda in 4 parts of warm water, and cooled to less than  $10^{\circ}\text{C.}=50^{\circ}\text{F.}$ , crystallizes after the

bottle is opened, and agitated, gives out an increase of temperature amounting to  $8^{\circ}=14.4^{\circ}$ . A solution of acetate of soda, strongly concentrated by evaporation, and then cooled to  $+10^{\circ}=50^{\circ}$  F. in a loosely-covered vessel, remains in the liquid state. If it be then decanted into another vessel, it solidifies somewhat rapidly into a fibrous mass, while its temperature rises to  $52.5^{\circ}=126.5^{\circ}$  F. (GMELIN.) FLASHOFF (*Br. Arch.* 38, 326,) obtained under similar circumstances an increase of temperature of  $59^{\circ}$  C. =  $138^{\circ}$  F.; a crystal of acetate of soda, thrown into the liquor, produces crystallization; less rapidly, however, than in the case of sulphate of soda (OGDEN.) A hot solution of sulphate of magnesia frequently remains liquid when cooled in closed vessels, and yields by agitation granular crystals (COXE.) A drop of spirit of wine produces therein a centre from which the crystallization commences (OGDEN.) A mixture of saltpetre and sulphuric acid heated for some time yielded a clear liquid, which, on cooling, consolidated only after a crystal of saltpetre had been thrown into it, at the same time evolving heat (GREEN, *Gilb.* 70, 320.) The following salts resemble in their properties those just mentioned:—Subsulphate of soda (HEEREN); carbonate, phosphate, and borate of soda (GAY-LUSSAC); nitrate of lime, sulphate of magnesia, sulphate of copper, sulphate of silver, sugar of lead (FISCHER, *Schw.* 12, 187); nitrate of ammonia, bisulphate of potassa, bichromate of potassa, muriate of barytes, ammonia, sulphate of magnesia, sulphate of oxide of zinc, ferrocyanate of potassa, oxalate of ammonia, potassiotartrate of soda, and potassiotartrate of antimony (OGDEN.) Alum, sulphate of iron, and copper, yield, indeed, on cooling their solutions, a considerable quantity of crystals; but after opening and agitating the vessels a still further quantity (COXE.) Nitro pectic-acid also possesses the same property (MULDER, *J. pr. Ch.* 16, 293.) On the other hand, crystals are formed from saturated and warm solutions, if cooled in the slightest degree, of sulphate and muriate of ammonia, sulphate, chlorate, nitrate, and simple chromate of potassa, chloride of potassium, common salt, barytes, strontian, nitrate of barytes, potassio-sulphate of magnesia, sulphate of lead, sublimate of quicksilver, and oxalic acid (GAY-LUSSAC, OGDEN.) In general those bodies which furnish the before-mentioned anomalous phenomenon assume, the crystalline form in combination with a considerable quantity of water of crystallization (with the exception of the bichromate of potassa and the nitrate of silver,) and those which do not furnish this phenomenon, with little or no water of crystallization, BERTHOLLET (*Statique Chim.* 1, 32,) and GAY-LUSSAC, ascribe this anomalous state to a tardiness in their molecules; and THENARD is likewise of opinion that those parts are brought into another position

with reference to each other, by agitation. Agitation, however, does not always produce crystallization in closed vessels; at all events, it may be supposed that the cohesive power of a body frequently excites its influence in consequence of a mechanical cause, in which case this power overwhelms other forces, *e. g.*, that of the affinity of the body for caloric, or to the medium employed for diffusing the substance in question. Consult GAY-LUSSAC (*Ann. Chim.* 87, 225, and SCHW. 9, 70;) and further *Ann. Chim. Phys.* 11, 301; SCHWEIGGER (*Schw.* 979); ZIZ (*Schw.* 15, 160); THOMSON (*Ann. Phil.* 19, 169;) H. OGDEN (*N. Ed. Phil. T.* 13, 309.)

II. If the body intended to be crystallized has been made fluid by combining it with another ponderable body, the latter must be removed. This is done either by expelling it in the form of vapour, whether at a high or low temperature, in the air, or in vacuo, or by depriving it of the substance employed for liquefaction, by adding some other ponderable substance. Thus saltpetre crystallizes from its aqueous solution by adding spirit of wine; camphor from its alcoholic solution by the addition of water; iodine from hydriodic acid gas by adding a little chlorine.

The following observations occur during the process of crystallization:—1stly. The slower the liquified substance is reduced to the state of solidity, and the less it is disturbed, the fewer, larger, and more distinct, are the crystals formed; the quicker the temperature is lowered, or the means of solution withdrawn, the more numerous, smaller, and indistinct are the produced crystals; for in the former case, time is afforded to the molecules of the consolidating body to attach themselves regularly to those which have been previously disengaged from the liquor, and which form the generating point of a crystal. If, on the contrary, during crystallization rapidly ensuing, many particles consolidate simultaneously, each of them forms a nucleus around which the rest of the mass ranges itself, and a greater number of crystals are interwoven with each other, and thus are less distinctly formed. On this observation, the difference between sugar-candy and loaf sugar is founded. Generally, also, all granular and fibrous formations, as marble in salt mines, and fibrous gypsum, must be considered as an accumulation of as many imperfect crystals as there are grains or fibres. According to LEBLANC (*J. Phys.* 55, 300) in order to obtain from solutions the largest and most regular crystals, a solution not completely saturated is allowed to cool slowly, when a few crystals only are produced, the most perfect of which are selected, and placed separately in a solution of the same salt, which is charged with the salt in question, only a little more than it is able to hold in solution at the ordinary temperature by slightly heating the solution, and which therefore gradually deposits the excess on the crystals which have been placed therein. The same operation is re-

peated until the crystals have obtained the desired size. They are, however, to be turned repeatedly, because the side of the crystals touching the bottom are rather prevented from taking up the crystalline substance. In order to avoid the trouble of repeatedly preparing a somewhat more saturated solution, some of the salt may be suspended in a gauze bag or funnel, in the upper part of the solution, saturated at the ordinary temperature; for as by the change of temperature the warmer parts of the liquor ascend to the surface, and dissolve a portion of the salt therein suspended, and then increasing in their specific gravity descend to the crystals at the bottom of the vessel, the crystals gradually increase in size, and it is only requisite to turn them repeatedly.

2dly. On their first origin, so far at least as can be ascertained by observation, the crystals appear in general in the same shape as afterwards; and it is *not* found that the primary shape is formed, which afterwards, by the further addition of matter, according to certain laws, passes into the secondary form. Thus the octahedron of alum, as recently ascertained by F. RICHTER (*Zeitschr. Ph. v. W.* 3, 348) shows on its first formation the same obtuseness of angles and corners as when examined after its complete formation. If, however, the further formation of the crystals be continued at different epochs, and from liquids of a different kind, their shape is frequently altered. This can be observed in many crystallized minerals, the nucleus and the shell of which appear frequently of a different colour. According to F. RICHTER, (*Zeitschr. Ph. v. W.* 2, 111) in fluora rose-coloured octahedron is found inclosed in a green cube; a yellow cubo-octahedron (fig. 4), the octahedral surfaces of which are only covered with a violet layer; a blue dodecahedron (fig. 3), inclosed in a green cube; a cubo-octahedron (fig. 4), in a pyramido-cube (fig. 9), &c. The interior and the exterior mass are found to be formed in such cases of a parallel arrangement of the laminæ. Calcareous spar, and other mineral bodies, according to RICHTER, present similar phenomena.

3dly. Crystals form on the places where the liquefying principle has been withdrawn, or where they are caused to attach by their adhesive force. Thus they form on the surface of the liquor, because evaporation or refrigeration is caused by the air, and attraction between the air and the crystals here takes place. Further, also, at the bottom and on the sides of the vessel, because they allow the caloric to pass therefrom, and because they exert their attractive power on the crystals, and lastly on solid bodies plunged into the liquor, since they act by attraction. Crystals generally attach much easier to wood and yarn than to porcelain, glass, and metal; more readily to porcelain than to glass; more readily to ground glass than to smooth glass (com-

pare Griffith's Ann. Pharm. 22, 210); and this may, perhaps, furnish an explanation of the phenomenon, that if, in a glass vessel containing a crystalline liquor, a glass rod is here and there passed over the inside, the crystals chiefly adhere to those places. The crystalline mass first formed then furnishes a point where the rest adhere, and attracts them with a greater power than foreign substances. Thus, according to Lowitz, in a solution of saltpetre and Glauber's salt, prepared at a high temperature, and then cooled, a crystal of saltpetre, and a crystal of Glauber's salt, cause a simultaneous but separate formation of saltpetre and Glauber's salt, whilst, from the same solution, left by itself, both salts assume crystalline forms mixed with each other. If a drop of solution of gypsum is allowed to evaporate on a lamina of a recently separated crystal of gypsum, numerous crystals of gypsum may be perceived by the aid of a microscope, the whole of which are parallel with each other, and the lamina of gypsum. This parallelism does not take place by employing foreign substances (FRANKENHEIM, *Pogg.* 27, 516). On evaporating a solution at a temperature beneath the boiling point, the first crystals generally adhere to the circle formed around the vessel at the uppermost limits of the liquor; the rest of the liquor frequently ascends in the crystals thus formed, and furnishes new crystals by evaporation, which finally ascend over the brim of the vessel. This is what we call efflorescence. If crystals deposit from the lower portions of their solution, a current is observed in the liquor, which is produced by each crystal depriving that portion of the solution with which it is in contact of as much of the crystalline surface as possible, in certain proportions, thus diminishing its specific gravity, and causing it to ascend to the surface in order to give place to those portions of the liquor which are more strongly impregnated.

4thly. If a body assumes the crystalline form from a solution, and this latter is not completely removed by evaporation, the mother liquor remains behind with the crystals. This is the liquor which still contains in solution such portion of the crystallizing substance as is allowed by the quantity of the liquor and its temperature. It frequently occurs that small portions of this liquor, variable in quantity even in the same liquid, are enclosed in the crystallized substance, as water of decrepitation, especially if the process of crystallization has taken place with rapidity, and the uniting crystalline laminae leave interstices between each other. The crystals containing this water not fusing before the inclosed mother liquor arrives at its boiling point, furnish, when heated, the phenomenon of decrepitation, the steam evolved from its mother liquor forcibly bursting the mass. This water of decrepitation, which as an occasional and mechanical addition, exerts no influence on the

crystalline form, and must be clearly distinguished from the chymically-combined water of crystallization contained in certain crystals in fixed proportions, and on which their form depends. Common salt, if crystallized by slowly evaporating the aqueous solution, does not decrepitate, but vehemently, if obtained by quickly boiling the solution. Some kinds of calcareous spar decrepitate, not so others. According to BAURDIMONT (*J. Pharm.* 22, 337,) who ascribes decrepitation as arising merely from an unequal heating of the laminar substance (?), this property is chiefly apparent in the iodide, bromide, and chloride of potassium, in the bromide and chloride of sodium, the sulphate, chromate, and bichromate of potassa, sulphate of barytes, red ferrocyanate of potassium, and cyanide of mercury.

[To be continued.]

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ART. III.—*Elementary Course of Pharmacy, chiefly from the German of P. A. Cap and Rudolph Brandes, collated with the Works of Phæbus, Soubeiran, Guibourt, Lecanu, Duflos, Gmelin, &c. &c.*

[Continued from page 416.]

§ 12. *Course of instruction.*—The course of instruction, therefore, embraces the following periods:—

A. *The period of preparation* is the same as that of every well educated man, and is obtained by well directed studies in public or private schools.

B. *The term of apprenticeship.*

C. *The term of improvement.*

These comprise likewise the arrangement we have sketched with the view of detailing the general principles which form the object of this work. We intend to discuss the three before-mentioned periods consecutively, appointing to each the importance they deserve, and endeavouring to state, clearly and precisely, the most essential facts connected with them, avoiding, as much as possible, details which more properly belong to the various treatises on the different branches of pharmacy. Before, however, we address ourselves to this main object of our work, we deem it necessary to state, in few words, the order, extent, and term of a pharmaceutical apprenticeship. If we deviate in some points from the system hitherto observed in England, our views may not be considered injudicious in attempting to anticipate that necessity for reform in the instruction of the young pharmacist, which, from the progress of public opinion, is evidently as necessary as in other instances; besides which, the system about to be suggested is already followed in some establishments, and in several countries has even been prescribed by law.

§ 13. We may now pass over the preparatory studies, since we shall soon return to them. Pharmaceutical instruction, generally continuing from five to six years, commences on the expiration of such scholastic studies. The first period comprehends a term of four years, devoted to the practical attainment of the art, and is termed *apprenticeship*. The second period should comprehend one or two years devoted to theoretical attainments, and may be termed *the period of improvement*.

§ 14. *Apprenticeship*.—The principal aim of the first period is the attainment of the art of preparing remedies. The apprentice exercises himself during this period in such operations as are practised in Pharmacy, using the closer acceptation of the word. His task is to endeavour to render himself capable of properly conducting all the manipulations and processes which occur in the duties of the shop of a chymist and druggist.

This period should be divided into two epochs, each occupying two years.

During the first epoch, the young man admitted in the apothecary's shop is an *under apprentice*; and at the expiration of that term he becomes a first apprentice, provided he has proved, to the satisfaction of his master, that he is conversant with the first details of botanical, chymical, and pharmaceutical nomenclature, and the primary elements of pharmacy. During the first epoch he takes part in the labours of the laboratory, according to circumstances. In the second epoch he is more fully entrusted with the labours of the laboratory, and, if required, takes part, under especial surveillance of the conductor of the dispensary, in the preparation of prescriptions.

According to the extent and the arrangements of the business in which the pupil is engaged, this method is subject to many variations, which cannot be detailed with perfect accuracy, especially in shops where one apprentice only is kept. The principle to be kept in view, however, is, that the first years are destined for instruction in the operations of the laboratory, and for the minor tasks in the dispensary. Usually, however, the different details of the business are so closely connected, that application to one prepares the way for another.

§ 15. *Improvement comprehends the time devoted to the methodical study of the different sciences which complete a pharmaceutical education*. The attainments to be acquired during this period embrace the more scientific study of the different branches of natural history (mineralogy, botany, and zoology,) of physics, chymistry, toxicology, knowledge of drugs, as well as the practice of the finer chymical and pharmaceutical operations, which can only be acquired in large laboratories, and under the eye of able teachers.

These studies may either be pursued in a university, where

the various professors hold their classes, or in schools specially devoted to pharmacy, and may be entered upon either immediately on the expiration of apprenticeship, or, still better, some years afterwards, the young man meanwhile practising as an assistant, with a view to acquire more practice, and by diligently reading and storing up the theoretical views of our best writers on the above subjects, so as to derive as much benefit as possible from the oral instructions conveyed during a course of lectures.

§ 16. *Advantages of a System of Instruction.*—The position which we have suggested in this course, for the acquirement of pharmaceutical instruction by practice, before entering into theory, is not only based on custom, as hitherto practised in the trade, but also on important reasons. It is doubtless correct and proper, that in a branch consisting more of scientific observations and combinations than of positive detail and practical application thereof, that theoretical study should precede experiment, in order that the mind of the young man may acquire the habit of being fully in possession of the leading views and the capability of applying them. But if the art in question be of practical application rather than the study of scientific facts, practice must have precedence, in order that the pupil may accustom himself at an early period to the material details of such art, and that he may be secured against the errors of a career unfortunately prone to speculation, and from which erroneous line of conduct it cannot be too strongly impressed he should carefully guard himself.

We are far from maintaining, however, that one of these plans should be adopted to the exclusion of the other; on the contrary, both should be combined. Whilst the pupil devotes himself to the practice of manual operations, he will be found continually endeavouring to understand their theory, principles, and connexion with each other. It is obvious, however, that an acquaintance with the facts themselves must precede any explanation of them, and that theoretical instructions cannot yield any useful result unless each principle be firmly connected with those facts—the one forming the foundation, and the other the test of the instruction which has to be acquired.

§ 17. *Examination.*—At the termination of the first period of pharmaceutical apprenticeship, the pupil should be examined by parties appointed by Government, or, still better, as is the case in several foreign States, by a special committee, consisting of chymists and druggists, and some officially-appointed physician, as to whether he possesses the attainments that he ought to have acquired during the period of apprenticeship, and is capable of undertaking the situation of assistant. If honourably passed, the young student should receive a certificate, announc-



ing the result of this his preparatory examination. At the commencement of the second period of pharmaceutical apprenticeship, when he begins to enter upon higher duties, being already conversant with the practical part of his art, it remains for the pupil to prove his attainments acquired so far; and at the end of this second division of his apprenticeship, he receives from the committee appointed for the purpose, a testimonial, having reference to the knowledge and skill he has acquired up to that time in his future profession.

§ 18. *Public Examination.*—After having honourably completed the term of his apprenticeship and the ensuing period of his studies, and after having served for several years in different chymists' shops as an assistant, the young pharmacist may deem himself prepared to undergo a public examination, in order to prove before a committee to be appointed by Government to undertake such examination; and after having placed before such committee his testimonials of character, and the manner in which he has performed the various theoretical and practical tasks submitted to him, and by a final and verbal examination, that he has acquired all the attainments required by the public, to assure them that he is competent and trustworthy to conduct a business on his own account. He is then in possession of attainments which fully entitle him to take the degree of Doctor Philosophiæ, which we would earnestly urge upon those who seek to elevate their position, to agitate most strenuously for.

§ 19. *General Remarks on Preparatory Studies.*—Loud complaints have been made, if not in England, yet abroad, that instruction in the schools is too exclusively directed to classic attainments, and that the pupils are for a too long space of time occupied with objects which are totally unconnected with the business of life. This objection is not wholly without foundation in some instances; it does not in the least apply, however, to the medical profession or any of its branches. It is obvious that the chymist and druggist, whose art is based on various departments of science, must be prepared to pass through all those branches of instruction which form the basis of a good education, or of a learned profession. The influence of good scholastic tuition extends over the whole period of life, and its want is deeply felt in almost every situation formed by the different relations of society. If the right time for acquiring these attainments has once been allowed to pass neglected, it is lost for ever, with all its good results; it is vain to hope that time will make amends for such neglect.

§ 20. It cannot be denied that the occupation of a chymist and druggist offers at the commencement of the term of apprenticeship some difficulties and annoyances. It is necessary to inform parents, who destine their sons for this occupation, that

their sons should feel a real predilection for it, and on the part of the pupil a decided inclination and firm determination to overcome these annoyances should be paramount. Immediately after having left school, he ought to occupy himself with the practical part of his art, and during this period if even, speculative research be entirely neglected, he seldom finds time to return to the study of the classics. The numerous details of a dispensatory—the attraction of new objects presented to him—the wonders of physics and chymical processes, will incessantly occupy his attention, and finally convert him into an enthusiastic lover of his profession.

Previous to devoting himself entirely to this art, it is necessary that the intended apprentice should have attained as far as possible in his scholastic studies. Meanwhile the attentive tutor will endeavour to give an impetus to his pursuits in a direction calculated to assist him in his future vocation. POGGENDORFF observes with justice, that those who wish to devote themselves successfully to pharmacy need possess first-rate talents, and have been favoured with an excellent education.

§ 21. The pupil should first occupy himself with the Latin and Greek languages, because they form the foundation of all scientific technology, whilst in studying them he will become acquainted with the classic writers of antiquity; and, lastly, because excellent works relating to his art have been written in these two languages, which deserve to be read in the original, and some of which have not hitherto been translated. The study of the ancient languages is never so successfully pursued as during youth. Since nearly all the technical terms of the medical sciences are of Greek origin, whilst those of the natural sciences are chiefly formed from the Latin, and as our Pharmacopœias, with but few recent exceptions, are written in the Latin language, the necessity of being well informed in these languages is apparent. With merely a superficial knowledge of Latin, the pharmaciens constantly runs the risk of making mistakes in the execution of prescriptions, which prescriptions are invariably written in Latin. This causes great inconvenience, and sometimes painful accidents, exposing the less educated chymist to the heaviest responsibility. If a profound study of Latin be necessary to him who writes in this language, it is also absolutely essential for him who has to interpret such prescriptions; and in such cases perfect ignorance would certainly be preferable to that imperfect knowledge which causes its possessor to suppose he can never be mistaken.

“ Drink deep, or taste not the Pierian spring.”

The knowledge of the *living* languages enables him to follow the progress of science among his contemporaries in foreign nations.

By the knowledge of *history*, which throws a light on the past, he will afterwards learn to understand the connexion of the epochs of his science with those of universal history. *Geography* will guide him to a precise knowledge of the origin of natural bodies, and of the changes produced in them by the influence of different climates.

§ 22. The study of the *mathematical sciences* is at the present time indispensable to the pharmacist. It is impossible for the pupil, either during his apprenticeship, whilst engaged in the practical occupations of his employer's laboratory, or during his studies pursued in an establishment for further instruction, to make any decent progress without having acquired a certain knowledge of mathematics. By means of Arithmetic he becomes acquainted with the calculation of the proportions, and with the different systems of weights and measures; by Algebra he is practised in the art of representing quantities and elements by symbols; Geometry prepares him for the study of those forms which mineral substances and salts assume during crystallization.

Primarily, however, as being very essential, the pupil should not neglect elementary instruction in physics, chymistry, and natural history, which at the present time forms an essential part of a good education, and lectures on which are now given, more or less detailed, in almost all public schools. Such instruction will inspire him with a taste for these beautiful and interesting sciences, and will be an excellent introduction to his later and more profound studies.

[To be continued.]

ART. IV.—*On the Analysis of Oxygall, and the Characteristic Properties of its Elements.* By the Baron J. BERZELIUS.

[From the Kongl. Vet. Acad. Handl.]

[Continued from page 403.]

By decomposing the soda solution with sulphuric acid, after evaporation of the ether contained in it, bilin, a plaster-like acid, and a precipitate insoluble in water, were obtained in the acid liquor. It was treated as before with ether. The two first portions of ether added to it, partly dissolved it, whilst drops of bilin, dissolved in water, fell down, and a magma, not soluble therein, collected at the bottom. When a third portion of ether was added, and left in contact with it for twenty-four hours, this magma was converted into a copious, snowy-white, laminar crystallization of cholic acid, among the laminae of which the liquid bilin was absorbed. The ether was decanted, and the cholic acid washed first with ether, in order to remove the ethereal solution, and then with water, in order to disengage the liquid bilin. During this proceeding, a considerable quantity of cholic acid remained behind in fine crystalline scales.

The residue, after removing the ether by distillation, was dissolved in carbonate of soda, and again treated with ether, which then extracted but a very slight quantity indeed. Whilst precipitating the combination of soda by sulphuric acid, a glutinous acid was disengaged, and some crystals of cholic acid formed from the acid liquor on the inside of the glass.

The soft and glutinous acid was repeatedly treated with small quantities of ether, and each of these portions distilled separately. The first portion digested left a residue consisting almost entirely of fellanic and fellinic acids, mixed with a little cholic acid; the second contained some of the glutinous acid; the third, after being precipitated from the alkali, formed a coherent mass. Those parts insoluble in ether, yielded, when treated with the water of barytes, a soluble salt of barytes combined with the same acid, and undissolved cholate of barytes.

When the solution of this glutinous acid in soda was treated with sulphuric acid, bilin was always obtained in the acid liquor, and by dissolving the acid in water of barytes, this cholate of barytes, and a salt of barytes of the said acid, combined with bilin, were obtained, leaving behind cholate of barytes. This might lead to the inference, that this glutinous acid, which dissolves with difficulty in ether, is a mixture of bilicholic and bilicholinic acids. Whether there is another, still less soluble in ether, I am unable to decide.

The liquid bilin, after being separated from the crystals of cholic acid, was, together with the water used for washing them, treated in the ordinary way with recently precipitated oxide of lead previously washed, when a plaster-like precipitate of lead was obtained, and at the same time bilin, which was disengaged by anhydrous alcohol, leaving behind a no very inconsiderable quantity of that white substance which cannot be dissolved in pure alcohol.

The plaster-like mass, when treated with carbonate of soda, precipitated by sulphuric acid, and infused with ether, yielded a solution of bilin, a portion of crystallized cholic, fellanic, and fellinic acids.

When the plaster-like salt of lead, obtained from this solution of bilin, was again submitted to similar treatment, some traces only of crystallized cholic acid were obtained, and very little solution of bilin. The substances which did not dissolve in ether consisted, for the greater part, of the before-mentioned glutinous acid, which easily dissolved in solution of barytes.

The general results of this examination are, that a great deal of the bilin, contained in gall when liquid, is changed into ammonia and cholic acid; that fellanic acid forms therein; that fellinic and cholinic acids are still contained therein; whether, however, unchanged in quantity or not I am unable to decide.

I was likewise unable to discover any traces of cholanic acid and of taurin, from experiments undertaken for the especial purpose of discovering them. The bilifulvin appeared to be entirely destroyed, so likewise the extract soluble in alcohol, imparting the yellow colour, because all the products therefrom obtained were colourless, or slightly coloured.

*4. A solution of Fresh Gall in pure alcohol, freed from bases and sulphuric acid, analysed after being kept for nine months.*

I was obliged to leave an analysis of fresh gall, after it had already been treated with barytes and sulphuric acid. The liquor was filtered into a vessel, for the purpose of preserving it, through a filter, which was filled to two-thirds with moist carbonate of lead, which was afterwards washed with alcohol. The solution, thus obtained, was then left standing, from the end of the month of June until the commencement of April in the ensuing year. The room was during this time kept at the common temperature of a sitting-room.

This solution was then again treated according to the method previously detailed, when it soon became apparent that alterations had taken place during the time specified. It contained taurin and fellanic acid, and also undeniable traces of cholic acid. Alcohol had not, therefore, been able to protect it against the progress of decomposition.

I had, indeed, intended to have directed these experiments to the quantitative analysis of gall; I, however, soon met with proof of the impossibility of executing these separations in such a way that the weight of the quantities obtained could be fixed with any approximation to precision, wherefore I avoided a course which would have cost much time and trouble without leading to the end in view.

THE ELEMENTS OF GALL MORE CLOSELY DEFINED IN THEIR  
LEADING PROPERTIES.

1. *Bilin*.—Bilin forms the chief part of fresh gall, at the expense of which the acids peculiar to gall take their origin, perhaps whilst still in the body of the animal, and certainly very quickly after being removed.

Bilin, the preparation of which has been detailed in the preceding narration, is a perfectly amorphous body in the pure state, hard, transparent, and colourless, although it is sometimes obtained, in experiments for its preparation, of a yellowish, sometimes of a perfectly yellow colour, produced by colouring matters which cannot be entirely separated. In order to obtain it colourless it is best to employ old gall, as the colouring matters contained therein are already destroyed; but in this case it is difficult to separate it from a salt of soda, which obstinately adheres to it. It is perfectly neutral, of a bitter taste like gall, and after-

wards leaves a somewhat sweetish taste, resembling that of Spanish liquorice, or rather that of the bitter sweet substance in the *Abrus precatorious*: this slightly sweetish sensation is chiefly felt afterwards in the throat. Whether this slightly sweetish taste is a natural property of bilin, or produced by any foreign substance mixed with it, I am unable to decide; for as gall contains salts of fatty acids,—that is to say, saponified fat,—it may be, perhaps, that glycerin is contained therein, which has become free during the process of saponification, and which, by the proceedings for obtaining bilin in its isolated state, it may perhaps be impossible to remove therefrom. Bilin has no odour; if dissolved in water, and then evaporated by heat, it evolves a smell like boiled glue. It does not deliquesce in the air, but in dry air is soon covered with numerous fine fissures, in consequence of which it loses its transparency. In this state it contains a quantity of water, which it yields up at a temperature of  $+ 140^{\circ}$ ,  $= 284^{\circ}$  F., becoming at the same time a semi-fluid mass, which is inflated by numerous bubbles, and which can easily be ground to a colourless powder: this absorbs gradually the lost water from the air, thus becoming coherent, and forming a transparent shining mass as before. It dissolves in water in all proportions, forming with it either a thick extract-like mass, or a solution at pleasure, which, when diluted, does not depose any sediment. It dissolves likewise in alcohol, either pure or containing water in any proportion; by ether, however, it is so very slightly acted upon, that it may be considered as insoluble therein, if the experiment be undertaken with the requisite care.

It is not precipitated by concentrated or diluted acids, not even by tannic acids; but by the strongest acids, with simple radical, sulphuric, phosphoric, nitric, and muriatic acids, its composition is gradually altered if exposed to the influence of heat. This occurs to the extent that bilifellinic and bilicholinic acids are deposited from the liquor. Bilin is then converted into these two acids, which, themselves, finally pass into that condition which I have termed Dyslysin. Besides this, taurin is formed in the liquor, and the acid has taken up a quantity of newly formed ammonia.

Nitric acid produces the same effect; it afterwards destroys the different products, and, by evaporating the solution to dryness in the water bath, a porous, clear, swollen mass remains, which easily dissolves in water, leaving behind a brown, resinous, and not bitter substance, which is not acid, and dissolves in boiling water. From the parts which dissolve in cold water some traces of taurin may be separated by alcohol.

[To be continued.]

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ART. V.—*Creasote*.

CREASOTE is a product of the dry distillation of organic bodies, and the peculiar preservative principle of smoke and pyroligneous acid. It prevents the decomposition of meat, and thence its name from κρεας (flesh,) and σωζειν (to preserve.)

It is chiefly manufactured from wood-tar, in which it is sometimes contained to 20 per cent. Its components are carbon, hydrogen, and oxygen, in a proportion not yet precisely ascertained.

It is a colourless and transparent liquor, specific weight of little more than water, of a peculiar, unpleasant, penetrating odour, and a very pungent and caustic taste; acts in a state of concentration like a poison, makes the eyes feel painful, boils at  $203^{\circ} = 397^{\circ}$  F., does not consolidate even at  $21^{\circ} = -5^{\circ}$  F.; produces on paper, greasy spots, which afterwards disappear; dissolves in 80 parts of water, and mixes in any proportion with spirit of wine, ether, essential and fat oils, acetic acid, and ammonia. It dissolves iodine, phosphorus, sulphur, resins, and alkaloids. The aqueous solution is neutral, and precipitates solutions of gum and the white of eggs.

Creasote is easily distinguished by its odour. If of a good quality, it indicates the following properties:—

a. If shaken with an equal volume of water in a narrow test-tube, not more than the eightieth (80th) part disappears; otherwise it contains water, of which creasote is able to assume 1-10th, without becoming turbid.

b. If it can be dissolved completely in 80 parts by weight of water at a medium temperature, it then forms a perfectly neutral liquid. An oily residue floating on the surface betrays the presence of other foreign products, as eupione, capnomore, picamar, which are obtained at the same time with the creasote during the dry distillation of organic substances.

Creasote is recommended for *internal* use against several diseases of the channels of digestion and the organs of respiration, against rheumatism and gout, torpid nervous fever, spasms, diabètes, tape-worm; in the form of pills; with the juice of Spanish liquorice as an emulsion; as an ethereal or spirituous solution; *externally* against chronic diseases of the skin, sores of different kinds, mortification, scalding; wounds as a styptic; caries of the teeth, and toothache thereby produced, mostly in the form of an aqueous solution (1 : 80); for poultices, lotions, and injections; and likewise, mixed with lard (5 drops to 1 drachm.) as an ointment; and, dissolved in spirit of wine, as a popular remedy for toothache. The opinions as to the effects of creasote as an internal remedy are divided, obviously because, as is generally the case with new remedies, too much was expected from

it, and it has therefore been employed in the most opposite diseases. It is doubtless most effective in the cases named, as an external remedy.—*A. Duflos's Pharmac. Chym.*

[Much of this discrepancy of opinion arises from the impurity of the preparation sold under that name.—See *Annals*, p. 270 and 364.—ED.]

## CHYMISTRY APPLIED TO AGRICULTURE.

### ART. VI.—*Products of Decomposition on the Surface of the Earth.*

[Continued from page 409.]

HUMINE, HUMIC ACID, ACID OF HUMUS, ULMINE, AND ULMIC ACID, GEINE, GRIC ACID, CREIC, AND APOCRENIC ACIDS.

If we treat cultivated land in the same manner, we arrive at analogous results, with this difference, that the inorganic earthy powder is mixed with the products that we obtain, whilst we do not meet with any soluble salts, these latter being usually dissolved and taken away by the rain.

The putrefaction of plants and animals on the upper layer of the terrestrial globe produces a great number of different matters, which remain unaltered for a long, others for a short time; and we have not at present any accurate means made known, whereby to separate the one from another. Doubtless we shall in the course of a short period succeed in resolving this problem, and be able to recognize the various matters contained in the soil, as also by various methods, we shall as undoubtedly procure each separate principle in an isolated state. At present we are acquainted only with a very few, which comprise those which exist in the soil in the greatest abundance.

From what has been stated, we have seen, that under the influence of heat the weak acids transform sugar, gum, and starch into a blackish-brown substance, to which we have given the name of *humic acid*, because it constitutes one of the principal components of humus (mould,) of which it sometimes forms many per cent. in weight. This substance is produced also when wood is burnt; it is found in the soot of chimnies, which explains the fertilizing action of soot on land, and on which account it is much used in some northern counties of Sweden and Norway. Braconnot has ascertained that it is formed when vegetable matters are treated with hydrate of potassa at a high temperature; it has also been detected by other chymists, when treating on the destruction of vegetable matters by means of alkalies. In every case it is obtained under two distinct modifications, in the acid and in an indifferent state, which have



been designated by the several terms humic acid and humine. It has received many names. By some it has been termed *acid of humus*, *ulmine*, and *ulmic acid*. There are several reasons wherefore these latter names should not be retained, and none more forcible than those afforded by Berzelius in treating on the analysis of elm bark. This author at one time used the names of *geine* and *geic acid* (from  $\gamma\eta$  earth), but he prefers the term *humine*, because it gives a better idea of all its various relations.

When we exhaust soil with water, we usually obtain a yellow solution, which, on evaporation in the water bath, leaves a yellow extract. When we re-digest this extract in a small quantity of water, there remains an abundant deposit, which contains humic acid. This solution has a weak, acid re-action, and by dry distillation the extract furnishes ammoniacal products. This ammonia, which demonstrates the presence of azote in the extract, is produced from another product of decomposition, formed from the components of vegetable albumen and gluten, contained in the urine and dung of animals. In decayed wood, this product is found in the state of admixture with humine and humic acid, and may be separated therefrom by means which we shall state further on. This product may also be obtained by other means than those of putrefaction, that is, by means analogous to those which occur when wood is treated with nitric acid. This body would also have been, as many others contained in the soil still are, unknown to us, had it not by chance been found free from humine. Berzelius first discovered it whilst analyzing water from the Porla spring, in Ostrogoth, which was so fully charged therewith as to colour the water yellow. For this reason he gave it the name of *crenic acid* (from  $\kappa\rho\eta\eta$ , a spring): another title, perhaps, would have rendered its comprehension more facile; but the talented chymist felt that it was his duty to connect its name with the circumstances of its discovery. It is found in the ochre which is deposited from many ferruginous waters, in naturally-formed ochres, and in marshy mines, where it exists as a subsalt of iron. It is met with as a combination with silica, in the remarkable remains of the covercles (cuirasse) of animalcular infusoria, which have received the name of fossil flour (Polisschiefer), and in which it is evidently a product of the mould of animals which were covered with these teguments. When this acid is exposed to the influence of the atmosphere, it is altered, and converted into a brown body, almost insoluble, and electronegative, nitrogenous, possessing the external characters of humic acid, and to which Berzelius has given the name of *apocrenic acid*. Such are the substances which are found in the aqueous extract of mould.

[To be continued.]

## PRACTICAL PHARMACY.

ART. VII.—*Liquor Volatilis, Cornu Cervi.*

*Synonymes.*—Carbonas ammoniæ, Ammoniæ pyroleosus liquidus s. Aquâ solutus, Liquor Carbonatis Ammoniæ c. Oleo empyreumatico. Spiritus cornu cervi rectificatus. Esprit de Corne de Cerf. Hartshorn spirit.]

The aqueous liquid which is obtained during the dry distillation of animal substances (formerly hartshorn was chiefly used), together with the offensive smelling empyreumatic oil and the solid salt of ammonia, and which is a saturated solution of these matters in water, is separated from them by decantation and filtration, and again submitted to repeated rectification, from an apparatus similar to that described in our last number for the distillation of liquor ammoniæ, &c. It is a clear, slightly yellowish, coloured liquor, of an empyreumatic ammoniacal odour, possessing the properties of a solution of carbonate of ammonia in water, impregnated with empyreumatic animal oil. If recently prepared, it contains some traces of prussic acid. Its specific weight should be from = 1.045 to 1.055, or, according to the London Pharmacopœia, = 1.060.

Hartshorn is discerned by its pungent odour, and its purity is ascertained in a similar way to that of the liquor ammoniæ caustici.\*

Rectified spirits of hartshorn, or the dissolved hartshorn salt, is employed for the same purpose as in its solid state; externally as embrocation, either separate or in form of a liniment.

*A. Duflos' Pharmac. Chémie.*

ART. VIII.—*Iodide of Sodium.*

*Synonymes.*—Sodæ hydriodas, iodetum s. ioduretum natrium s. sodicum s. sodii, hydriodas s. iodhydras natrius s. sodicus. Hydriodate de soude, iodure de sodium. Iodnatrium.

*Its preparation and properties.*—The iodide of sodium obtained, in the easiest manner, by precipitating the ioduret of iron, or zinc by means of carbonate of soda, has been applied latterly as a remedy, although it is much less used in medicine than iodide of potassium;—1stly, because it is so very deliquescent, that it speedily liquefies, if exposed to the air; and 2dly, because it assumes a crystalline form, both in the anhydrous state and when containing water, wherefore it is difficult to ascertain and apportion the exact dose. The iodide of sodium is, however, more easily decomposed than the iodide of potas-

\* See our next.

sium; wherefore some difference might possibly exist between the two bodies also in a therapeutical respect.

Iodide of sodium crystallizes in six-sided laminæ, containing  $20\frac{1}{4}$  per cent. of water. The anhydrous combination contains, in 100 parts, 15.55 of sodium, and 84.45 of iodine. At a temperature of above  $+ 50^{\circ} = 122^{\circ}$  .F, it crystallizes in anhydrous cubes. It dissolves easily in water and spirit of wine; and, as already mentioned, liquefies when exposed to the air. It fuses easily at a high temperature, absorbs oxygen, and loses a part of its iodine, which is not the case with the iodide of potassium.

*Criteria and tests.*—Iodide of sodium is recognised by the action of its aqueous solution on a solution of corrosive sublimate, and also tartaric acid. The former reagent yields with it a red precipitate, the latter is not precipitated. Its purity is tested by its perfect solubility in concentrated spirit of wine.

*A. Duflos' Pharmacol. Chymistry.*

#### ART. IX.—*On the Antimonium Crudum of Commerce.*

FOR several years a species of Antimonium crudum has been exported from England as raw gray ore of antimony, mixed with the stratum in which it occurs, and not purified by melting. It occurs in pieces from half a pound to eight pounds in weight, and of indefinite shape.

In order to ascertain its intrinsic value, I submitted it to analysis, when I found it composed, in 100 parts, of

|                              |              |
|------------------------------|--------------|
| Antimony . . . . .           | 53.0         |
| Sulphur . . . . .            | 20.0         |
| Oxide of iron . . . . .      | 0.3          |
| Mechanical admixture . . . . | 26.7         |
| Arsenic . . . . .            | some traces. |

B. R.

[It is evident that the above analysis was performed by first fusing the ore, and thus removing 26.7 per cent. of infusible matter, mechanically mixed; the homogeneous striated masses of the crude antimony of druggists, may be considered, therefore, as consisting of 27.3 parts of sulphur, and 72.7 of metallic antimony.—ED.]

#### ART. X.—*Purified Honey.*

THE following mode of purifying Honey is recommended by Siller:—Any quantity of honey is dissolved in an equal part by weight of water. The liquid is allowed to boil up 4 or 6 times without skimming; it is then removed from the fire, and after being cooled, brought on several strong linen strainers, stretched horizontally, and covered with a layer of clean and well-washed

sand, an inch in depth. When the solution has passed through the strainers, it is found to be of the colour of clear white wine; the sand being allowed to remain on the strainers, is rinsed with cold water, and the whole of the liquor is finally evaporated to the thickness of syrup.—*Jahrb. d. Pharm. Gesellsch., in St. Petersburg.*

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## GALVANISM AND ELECTRICITY.

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### ART. XI.—*On the Use of Carbon in Grove's Battery.*

SOME months since, being engaged in experiments with Grove's flat-celled battery, some of the prominent defects of form, construction, and expense, seemed to me to be remediable by another mode of construction, and the use of a cheaper negative element. About the same time I learnt that Berzelius had, in a letter to Dr. Hare, given an account of a battery where coke was at once the negative element and the containing vessel for the nitric acid.

I have since made many experiments, and now give the result, which seems most promising. Natural plumbago, or the mixture of it with sand—such as is used in the manufacture of crucibles—gives the form of carbon which is at once the most effective, cheap, and manageable. A battery was constructed of six cylindrical members of native plumbago, each element one inch in diameter and two inches high, placed in nitric acid of the commercial strength, contained in a cylindrical cup of porous queen's ware, and opposed by a circular zinc element amalgamated. The connection was formed by a wire dipping from each zinc into a mercury cup excavated in the top of the plumbago cylinders. This battery of six members gave results which were highly satisfactory. In decomposing power, it accomplishes more than 100 pairs of zinc and copper of six inches square each. It gave five cubic inches of the mixed gases of water in less than fifty seconds, or one cubic inch in twelve seconds. It also maintained for nearly an hour, at full incandescence, fourteen inches of No. 30 platina wire coiled into a spiral. In all other modes of exhibition it shows a proportionate power.

I am now constructing a battery of large series on this plan, and, when the results are obtained, will publish them more at length. I would remark to those who may be interested in constructing similar batteries, that plumbago is easily obtained from Sturbridge, Mass., of a compactness very suitable for batteries; and, moreover, that (as before remarked) the mixed plumbago\*

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\* To be obtained of J. W. Ingall, Taunton, Mass.

of the manufacturers of "black lead" ware, answers very well. The porous cells used in my experiments have been made at Jersey City, N. J.—*Silliman's Journal*, Oct. 1842.

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ART. XII.—*Confirmation of Moser's Discovery.*

M. BREGUET, son of the celebrated watchmaker, who lately proved his extraordinary skill by manufacturing an apparatus for M. Arago, which turns a mirror, making 2000 revolutions in a second, has made the following communication to the Parisian Academy:—

"It is known that the cases of modern watches are often furnished with a double case (*cuvette*), on which the name of the manufacturer is engraved. The interstice between this caspule and the case occupies, at the utmost, not more than the tenth of a millimeter. Now I observed frequently on the inside of the case a reversed, but very distinct, image of the name as engraved on the capsule. I have observed likewise, on different parts of machines arranged very near each other, that they presented more or less distinct representations of marks placed on the opposing parts. I considered these facts as very singular, and communicated them to several persons. Want of time, however, prevented me from studying them closer, and I therefore abstain from making them known."—*Compt. Rend.* xv. p. 450.

An analogous fact was observed some time ago by the philosophical instrument maker, M. Oertling, in grinding parallel glasses. The brass plate which is placed immediately over the glasses, and attached to their sides by cement, were provided for a certain purpose with circular furrows. Some of the glasses treated in this manner afford images of these furrows; but in most cases the eye is incapable of distinguishing the least spot: if, however, they be breathed upon, these images appear with great distinctness, and thus those parts which were in contact with the brass appear of a darker tinge. This peculiarity cannot be removed from the glasses by washing with spirit of wine or oil of turpentine. It requires a repetition of the grinding.—*Ann. d. Phys. u. Chem.* 1842, No. 10.

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REVIEWS.

ART. XIII.—*Faraday's Chemical Manipulation.* Third edition, revised. Pages 644. Murray, Albemarle Street.

Of the very many valuable works which have been furnished to the chymical student, "Faraday's Instructions on the Methods

of performing Experiments of Demonstration or Research with Accuracy and Success" stand pre-eminent. Clear, concise, and systematic, the author, in this, one of his earliest productions, has furnished his admirers with the key to his own pre-eminent success as a chymist. The most brilliant discoveries—and those of the author we are now quoting, in reference to electricity, furnish an instructive example—are usually the result of close, unostentatious, and inexpensive experiments, pursued under a system such as is throughout inculcated by this work. "Faraday's Manipulation" cannot be too earnestly recommended to the pharmacien. During the earlier years of our application to chymistry, the details of tube manipulation were a source of inexhaustible delight to us; and the doubts which have many a time and oft occurred in after years, have frequently and as readily been solved by experiments whose inexpensive details were suggested by this work. To the apprentice who hopes that an advanced position will shortly be taken by his craft, we therefore recommend it as a guide which cannot be consulted too often: during the spare moments which occur before the laboratory-furnace, or over the sand-bath, valuable and numerous are the hints that it will furnish to the intelligent pupil; and when the duties of the day have been brought to a conclusion, we advise the practice of a certain number of the various processes detailed at the conclusion of the volume. Certain we are that he who follows our advice will neither be an unprofitable servant nor an unsuccessful master.

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ART. XIV.—*Francis' Chymical Experiments.* Pp. 252.  
G. Berger, Holywell Street.

UPWARDS of two thousand experiments, narrated in popular style, and illustrated with numerous woodcuts. To those for whom this work is intended it is of no importance from whence these experiments have been obtained, neither, perhaps, ought we, who are so deeply indebted to foreign cotemporaries, have suggested that these sources in the present work are, for the most part, unacknowledged; but we do feel that their value is very much diminished from the omission in question; since where the names of Faraday, Berzelius, Liebig, Dumas, &c. are attached, the young experimentalist is at no loss as to whether the fault is in the work he has consulted, or his own want of skill. It is a book calculated to render chymistry popular, and the author has succeeded in his object of "presenting the information it contains within such a space and price, as to render the work accessible to all."

| NOMINA.                           | FORMULÆ.                                  |
|-----------------------------------|-------------------------------------------|
| <i>Brometum</i> Cerosum . . . . . | Ce Br <sub>2</sub> . . . . .              |
| — Chromicum . . . . .             | Cr <sub>2</sub> Br <sub>3</sub> . . . . . |
| — Chromicum . . . . .             | $\frac{1}{3}$ . . . . .                   |
| — Cobalticum . . . . .            | Co Br <sub>2</sub> . . . . .              |
| — Cupricum . . . . .              | Cu Br <sub>2</sub> . . . . .              |
| — Cuprosum . . . . .              | Cu <sub>2</sub> Br <sub>3</sub> . . . . . |
| — Ferricum . . . . .              | Fe <sub>2</sub> Br <sub>3</sub> . . . . . |
|                                   | $\frac{1}{3}$ . . . . .                   |
| — Ferrosium . . . . .             | Fe Br <sub>2</sub> . . . . .              |
| — Glucanicum . . . . .            | G <sub>2</sub> Br <sub>3</sub> . . . . .  |
|                                   | $\frac{1}{3}$ . . . . .                   |
| — Hydrargyricum . . . . .         | Hg Br <sub>2</sub> . . . . .              |
| — Hydrargyrosium . . . . .        | Hg <sub>2</sub> Br <sub>3</sub> . . . . . |
| — Iridicum . . . . .              | Jr Br <sub>2</sub> . . . . .              |
|                                   | $\frac{1}{2}$ . . . . .                   |
| — hyper Iridicum . . . . .        | Jr Br <sub>3</sub> . . . . .              |
|                                   | $\frac{1}{3}$ . . . . .                   |
| — Iridosum . . . . .              | Jr Br <sub>2</sub> . . . . .              |
| — hyper Iridosum . . . . .        | Jr <sub>2</sub> Br <sub>3</sub> . . . . . |
|                                   | $\frac{1}{3}$ . . . . .                   |
| — Kalicum . . . . .               | K Br <sub>2</sub> . . . . .               |
| — Lithicum . . . . .              | L Br <sub>2</sub> . . . . .               |
| — Magnesicum . . . . .            | Mg Br <sub>2</sub> . . . . .              |
| — Manganicum . . . . .            | Mn <sub>2</sub> Br <sub>3</sub> . . . . . |
|                                   | $\frac{1}{3}$ . . . . .                   |
| — Manganosum . . . . .            | Mn Br <sub>2</sub> . . . . .              |

| PONDERA ATOMORUM. |                    | PARTES CENTESIMALES. |       |                      |
|-------------------|--------------------|----------------------|-------|----------------------|
| O = 100           | H <sub>2</sub> = 1 | + E                  | — E   | H vel H <sub>2</sub> |
| 1553,00           | 124,44             | 37,00                | 63,00 |                      |
| 3638,55           | 291,56             | 19,34                | 80,66 |                      |
| 1212,85           | 97,19              |                      |       |                      |
| 1347,30           | 107,96             | 27,39                | 72,61 |                      |
| 1374,00           | 110,10             | 28,80                | 71,20 |                      |
| 1769,70           | 141,81             | 44,72                | 55,28 |                      |
| 3613,33           | 289,54             | 18,78                | 81,22 |                      |
| 1204,44           | 96,51              |                      |       |                      |
| 1317,51           | 105,57             | 25,75                | 74,25 |                      |
| 3597,44           | 288,27             | 18,42                | 81,58 |                      |
| 1199,15           | 69,09              |                      |       |                      |
| 2244,13           | 179,82             | 56,41                | 43,59 |                      |
| 3509,95           | 281,26             | 72,13                | 27,87 |                      |
| 3190,11           | 255,63             | 38,67                | 61,33 |                      |
| 1595,06           | 127,81             |                      |       |                      |
| 4168,42           | 334,02             | 29,59                | 70,41 |                      |
| 1389,47           | 111,34             |                      |       |                      |
| 2211,81           | 177,23             | 55,77                | 44,23 |                      |
| 5401,92           | 432,86             | 45,67                | 54,33 |                      |
| 1800,64           | 144,29             |                      |       |                      |
| 1468,22           | 117,65             | 33,37                | 66,63 |                      |
| 1058,64           | 84,83              | 7,59                 | 92,41 |                      |
| 1136,66           | 91,08              | 13,93                | 86,07 |                      |
| 3626,69           | 290,61             | 19,07                | 80,93 |                      |
| 1208,90           | 96,87              |                      |       |                      |
| 1324,19           | 106,11             | 26,12                | 73,88 |                      |



| NOMINA.                            | FORMULÆ.                                             |
|------------------------------------|------------------------------------------------------|
| <i>Brometum</i> Molybdicum . . . . | Mo Br <sub>3</sub> <sup>2</sup> . . . .              |
|                                    | $\frac{1}{2}$ . . . . .                              |
| — Molybdosum . . . .               | Mo Br <sub>2</sub> . . . .                           |
| — Natricum . . . .                 | Na Br <sub>2</sub> . . . .                           |
| — Niccolicum . . . .               | Ni Br <sub>2</sub> . . . .                           |
| — Osmicum . . . .                  | Os Br <sub>3</sub> <sup>2</sup> . . . .              |
|                                    | $\frac{1}{2}$ . . . . .                              |
| — hyper Osmicum . . .              | Os Br <sub>3</sub> <sup>2</sup> . . . .              |
|                                    | $\frac{1}{2}$ . . . . .                              |
| — Osmiosum . . . .                 | Os Br <sub>2</sub> . . . .                           |
| — hyper Osmiosum . .               | Os <sub>2</sub> Br <sub>3</sub> <sup>2</sup> . . . . |
|                                    | $\frac{1}{2}$ . . . . .                              |
| — Palladicum . . . .               | Pd Br <sub>3</sub> <sup>2</sup> . . . .              |
|                                    | $\frac{1}{2}$ . . . . .                              |
| — Palladosum . . . .               | Pd Br <sub>2</sub> . . . .                           |
| — Platinicum . . . .               | Pt Br <sub>3</sub> <sup>2</sup> . . . .              |
|                                    | $\frac{1}{2}$ . . . . .                              |
| — Platinosum . . . .               | Pt Br <sub>2</sub> . . . .                           |
| — Plumbicum . . . .                | Pb Br <sub>2</sub> . . . .                           |
| — Rhodicum . . . .                 | R <sub>2</sub> Br <sub>3</sub> <sup>2</sup> . . . .  |
|                                    | $\frac{1}{2}$ . . . . .                              |
| — Rhodosum . . . .                 | R Br <sub>2</sub> . . . .                            |
| — Selenii . . . .                  | Se Br . . . .                                        |
| — Stannicum . . . .                | Sn Br <sub>3</sub> <sup>2</sup> . . . .              |
|                                    | $\frac{1}{2}$ . . . . .                              |
| — Stannosum . . . .                | Sn Br <sub>2</sub> . . . .                           |

| PONDERA ATOMORUM. |                    | PARTES CENTESIMALES. |       |           |
|-------------------|--------------------|----------------------|-------|-----------|
| O = 100           | H <sub>a</sub> = 1 | + E                  | — E   | H vel H̄. |
| 2555,13           | 204,75             | 23,42                | 76,58 |           |
| 1277,57           | 102,37             |                      |       |           |
| 1576,83           | 126,35             | 37,96                | 62,04 |           |
| 1269,20           | 101,70             | 22,92                | 77,08 |           |
| 1347,98           | 108,02             | 27,42                | 72,58 |           |
| 3201,10           | 256,51             | 38,88                | 61,12 |           |
| 1600,55           | 128,25             |                      |       |           |
| 4179,41           | 334,90             | 29,78                | 70,22 |           |
| 1393,14           | 111,63             |                      |       |           |
| 2222,79           | 178,11             | 55,99                | 44,01 |           |
| 5423,89           | 434,62             | 45,89                | 54,11 |           |
| 1807,96           | 144,87             |                      |       |           |
| 2622,51           | 210,14             | 25,39                | 74,61 |           |
| 1311,26           | 105,07             |                      |       |           |
| 1644,21           | 131,73             | 40,50                | 59,50 |           |
| 3180,11           | 255,63             | 38,67                | 61,33 |           |
| 1595,06           | 127,81             |                      |       |           |
| 2211,81           | 177,23             | 55,77                | 44,23 |           |
| 2272,80           | 182,12             | 56,96                | 43,04 |           |
| 4237,69           | 339,57             | 30,74                | 69,26 |           |
| 1412,56           | 113,19             |                      |       |           |
| 1629,69           | 130,59             | 39,97                | 60,03 |           |
| 983,74            | 78,83              | 50,28                | 49,72 |           |
| 2691,91           | 215,71             | 27,31                | 72,69 |           |
| 1345,95           | 107,85             |                      |       |           |
| 1713,60           | 137,31             | 42,91                | 57,09 |           |

ART. XVI.—*Influence of Marriage on Longevity.*

DR. CASPER, of Berlin, has calculated, that the mortality among bachelors, from the age of 30 to 45 years, is 27 per cent., whilst among married men of the same age it is only 18 per cent. For forty-one bachelors who attained the age of 40 years, there are seventy-eight married men who attain the same age. The advantage in favour of married life is still more striking in persons of advanced age. At 60 years there remains but twenty-two bachelors for forty-eight married men; at 70 years, eleven bachelors for twenty-seven married; and at 80 years, three bachelors against nine married men.—*Journ. de Chimie Med.*

## MEETING OF THE PHARMACEUTICAL SOCIETY.

Wednesday Evening, Dec. 28th.

MR. PAYNE, Vice-President, in the Chair.

A LECTURE on practical pharmacy was delivered this evening in the rooms of the Society, at Bloomsbury Square, by Mr. Redwood, the curator. The importance of a knowledge of Chymistry, even in the most simple operations, was clearly pointed out by the lecturer, and the advantage of a scientific knowledge of the various processes urged on the audience in preference to following certain empirical formulæ. As an example of a few of the cases which the pharmacist is required to operate for himself, and where the drug grinders' services are of little avail, the obtaining phosphorus in a minute state of division was instanced; also see *ANNALS*, p. 181. This Mr. R. illustrated by fusing under spirits of wine by a gentle heat about 100°, and then by agitation and cooling. A milky emulsion of phosphorus and spirits of wine is the result. To obtain copper in a fine state of division (see *ANNALS*, p. 181) its precipitation was effected from a solution of the commercial sulphate by means of metallic zinc: the lecturer impressing the necessity of the operator assuring himself that the sulphate of copper was left in excess in the solution. The last example of the necessity of this theoretical knowledge was afforded in the case of the hydrated sesquioxide of iron, the rationale of which process the operator very lucidly explained. The directions for obtaining this antidote for arsenic free from basic sulphate appeared to us to have been gathered from Soubeiran's *Traité de Pharmacie*, t. ii. p. 420, which, from press of matter, we are compelled to defer until our next number. By the way, we think more stress was laid on the experiments quoted from the *American Journal of Pharmacy* than they are at present (until further corroborated) entitled.

The lecturer in conclusion adverted to the fact, that the main object of the Society, in comparison with which all vexatious and clashing interests connected with the policy of druggists was insignificant, were the advancement of their intellectual and technical information, and hinted how much more favourably placed was the chymist's apprentice as compared with the medical student; the attention of the former being confined to no ignoble field of exertion, whilst its very narrowness admitted of arriving at something like perfection; the medical student, on the other hand, compelled to divide his attention amid so many and such varied pursuits, a long life alone would enable him to become distinguished in all.

The Vice-President announced that a paper would be read by Dr. A. Thomson on some new salts of morphia on Wednesday, the 11th of January, 1843, after which the meeting separated.

We observe these lectures on pharmacy with much pleasure, as affording a sign of the desire to furnish practical improvement to the members of the Pharmaceutical Society. We had been given to understand that the duties of the lecturers of the school of pharmacy would be confined to morning deliveries alone; had this arrangement been carried out we are confident the auditory would have been (from necessity alone) far less numerous.

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\*.\* Communications, Books for Review, &c. are requested to be addressed  
—“To the Editors of the ANNALS OF CHYMISTRY, care of Messrs. Longman,  
Brown, and Co. Paternoster Row.”

WILSON AND OGILVY, 57, SKINNER STREET, SNOWHILL, LONDON.

THE  
ANNALS OF CHYMISTRY  
AND  
PRACTICAL PHARMACY.

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No. 15.]      FRIDAY, JANUARY 6, 1843.      [Vol. I.

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HOW TO OBTAIN A DRUGGISTS' CHARTER.

MANY druggists allege as a reason for not joining the Pharmaceutical Society, that they cannot afford the subscription. "The times," they cry, "are hard; and, even supposing that the Institution realizes all the expectations of its most sanguine supporters, we shrink from adding another annual tax to our heavy expenses. We must avoid the avoidable."

Still less can such men be expected to aid those literary efforts which some writers (may we class ourselves among the number?) have ventured to make in their behalf.

It is from these men that lamentations over the mournful position of chymists and druggists chiefly emanate; and as it is your lusty citizen who most complains of a crowd, so the eager competitor sighs the most over the evils produced by competition.

Let it be allowed us to draw a portrait of the more unfavourable specimens of this class. That it does not represent the majority even of that class we readily admit; but the painful truth of the picture will be acknowledged. Its prototypes are not far to seek. This subdivision, then, is composed chiefly of those who, having, perhaps, been unsuccessful in some other trade, sometimes a profession, with scarcely a tinge of education, without due reflection, and frequently in opposition to the remonstrances of friends, resolve to venture on what they exaggeratingly term a shop, and thus commence their career of laborious misery. Having contrived to obtain by payment in cash a few bottles with gilt labels they induce some neighbouring carpenter to fit up shelves for the same; while the hope that the first payment, at least, will be

made, tempts the wholesale druggist to join this conspiracy to lower the trade over which he presides. But the new dealer soon finds that the established druggist maintains the vantage-ground which respectability, backed by time, confers, and his very existence as a shop-keeper is threatened, unless he can find something to satisfy, in part, the claims which hang over him. He, therefore, resorts, as his first expedient, to the practice of ticketing; and this at prices which, taking into consideration the expenses of retail trade, and the small quantities sold at one time by the druggist, are utterly ruinous. Yet even this does not yield the hoped-for return, and he resorts, as his next device, to those hawkers who prowl about from shop to shop, and offer, at half their market-price, any goods with which they have been entrusted by parties in the position of those whom we now describe. This enables the wretched man to pay an instalment off his debts, so that the wholesale druggist, deceived by this gleam of sunshine, trusts him with another and another parcel. At length the storm bursts on the creditor's head; and he finds too late that his insolvent debtor has made shift to dispose of his business, and leave him a wiser, if not a better man.

It will be answered that such conduct is rare, and brings its own punishment with it. Both these assertions are true; yet it is equally certain that such practices do most seriously depress the drug trade, while they throw unmerited obloquy on all who practise so respectable a profession.

Every wrong, says Blackstone, has a remedy.

Now, if erroneous judgment too often produces fatal competition—competition which is practised not only at the expense of the individuals who begin it, but of those who are dragged into it against their will; and if it is conceded that those who are entrusted with the sale of drugs should be of high character; let the main body of druggists lay down some standard to which they are willing to submit, and which shall have for its object the maintenance of the credit of their order.

We should propose that, in future, licenses should be granted to those who intend to practise as druggists only on condition of their obtaining security for a certain sum; this security to be available to their creditors on proof of debts.

Were this step taken, the thoughtless trader could not injure the respectable druggist who supplied him ; and when he felt, that if he gave away his goods, it would be at the cost of himself or his securities, he would, assuredly, not part with his drugs, save on such terms as would enable him to fulfil his engagements.

While, on the one hand, the number of retailers would still be far too large to justify the accusation of monopoly ; on the other, the established trader, who pays his just debts, would no longer be exposed to the guerilla attacks of his flying opponent ; and the obloquy which properly belongs to the dregs of the profession, would be removed from the regulars of our great army, and confined to the followers of the camp.

This would be a great step gained. A guarantee thus furnished to society that the chymist would fulfil his pecuniary engagements, would be received as no mean proof of his professional skill ; and this golden bond would insure the union of a valuable class of men. The two-guinea subscription, on which we touched above, would not seem to them an exorbitant tax.

When thus united, it would not be difficult to frame a tariff, by which the prices of drugs in England might be raised to a proportionate level with those of the continent.

The principle that low prices increase consumption, is but half applicable to drugs ; few would take copious draughts of senna-tea, *de gaieté de cœur*, though it were cheaper than bohea ; and in like manner, a rise in prices, within moderate bounds, will not materially affect consumption.

Purity and excellency of the drugs, on which they rely in the hour of sickness, are the main points with the public ; and would it not be well for the legislature to enact that the druggist should furnish some guarantee for his procuring the best remedies from the best markets ?

Let the body of druggists, therefore, if they seek a charter from parliament, be prepared to offer this equivalent ; if they ask for privileges, let them offer respectability. Let them not dread the cry of " monopoly ;" for our proposal would not extinguish competition, but merely restrain it within the limits demanded by the common weal.

We have no fear that this pruning of the profession would

diminish the vigour of the remainder—quite the reverse. There is no difficulty in procuring the services of a clever attorney, though the stamp duty levied on admission into the profession is one hundred and twenty pounds.

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## CHYMISTRY, OPERATIVE AND EXPERIMENTAL.

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### ART. II.—*Veratrine*.

VERATRINE belongs to the class of organic alkalies, and occurs in the seed of *veratrum sabadilla*, and in the roots of *veratrum album*, from which it has been disengaged in an isolated condition. It is a white powder, passing, when exposed to a higher temperature, into a resin-like mass, of a pungent, burning, but not bitter taste. It has no odour, but if the dust enters into the nose it produces violent sneezing, which may cause dangerous consequences. It is insoluble in cold water, and requires about 1000 parts of boiling water in order to effect its solution. It dissolves easier in spirit of wine, but rather less readily in ether. In concentrated nitric acid it assumes a red and then a yellow colour; in sulphuric acid it becomes first yellow, then blood red, and finally beautifully violet. Dilute acids are completely neutralized by veratrine, and it produces with them salts partially crystallizable, which act still more powerfully than pure veratrine. Lately veratrine has been used as a remedy; the commercial veratrine is, however, very frequently adulterated, and contaminated with foreign matters, wherefore it is indispensable to submit it to a careful examination before it should be employed.

Veratrine is recognized by the phenomena just narrated with concentrated nitric acid and sulphuric acids; its purity is ascertained in the following manner:

*a* If it is completely consumed when heated on a thin platina plate over the spirit lamp.

*β* By a very slight diminution in weight if exactly ten grains of veratrine, are infused with about one hundred times as much water on a filter previously weighed, the filter then being dried with its contents after the water has passed through, and again weighed.

*γ* By complete solubility in from fifty to sixty parts of spirit of wine, and which solution does not yield any precipitate by a solution of platina.

Veratrine, if brought near the organs of smell, produces violent sneezing, with increased discharge of mucus, even emission of blood, and watering of the eyes. Applied to the mouth or

the throat it causes pungent burning, increased action of the salivary glands, stiffening of the tongue and the mouth. Internally applied, in very small doses of from one-sixth to one-fourth of a grain, it causes a slight burning in the stomach, beginning with an increase of appetite; afterwards causing a diminished desire for food. On remote parts, *e. g.* the elbows, shoulders, knees, in the face, on the back, a prickling sensation, alternate feeling of heat and cold, sometimes even a convulsive trembling of the muscles, occurs; the perspiration and secretion of urine is frequently increased, and even the secretion of the saliva and tears. Vomiting ensues rarely; perhaps it would occur with children; nor are the dry excretions promoted by such doses. Larger doses, however, produce vomiting and diarrhœa, sometimes causing bloody excretions. Externally rubbed into the skin, it causes redness, prickling, shrugging and heating of the skin; sometimes even pustular eruption of the skin ensues.

Veratrine, for therapeutical purposes, is generally externally applied in the form of ointment (from five to twenty grains, to one-half or one ounce of lard, a piece the size of a bean being rubbed into the skin every day as near as possible to the sore place), and endermically, from one-half to two grains of veratrine, applied to sore parts rendered by the previous application of a blister.

The most proper remedies in case of poisoning are mild, oily, and mucilaginous vehicles, combined with such remedies as contain tannic acid.—*A. Duflos's Pharmac. Chemie.*

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#### ART. III.—*Piperine.*

PIPERINE is contained in black and white pepper, from which it may be extracted by means of spirit of wine. It is a crystallizable and neutral element, and may be classed among organic chemical substances, forming in the pure state, transparent, sloping, rhombical columns, sometimes with obtuse angles, or delicate, loose needles adhering to each other. It appears frequently of a more or less yellow colour, in consequence of resin adhering to the crystal. It has no odour when in a state of perfect purity, scarcely any taste, is almost insoluble in water, more soluble in spirit of wine, less in ether and essential oils. The solutions act neither acid nor alkaline. Acids, especially acetic, dissolve piperine copiously, without, however, becoming neutralised in the slightest degree. It is decomposed by concentrated mineral acids, and dissolved, forming a strongly coloured solution; thus *e. g.* concentrated sulphuric acid dissolves it at a low temperature, yielding a solution of a dark, blood-red colour. Pure piperine contains in 100 parts, 73.95 carbon, 6.34 hydrogen, 4.10 azote, and 18.61 oxygen.



Piperine has been employed against intermittent fevers in doses of from six to twelve grains, but with very different results, probably arising from the circumstance that preparations were used by several parties which greatly differed in purity.—*A. Duflos's Pharmac. Chemie.*

ART. IV.—*Means of Purifying Zinc for making Hydrogen in Toxicological Experiments.* By ALPHONSE MEILLET.

By the following means I have invariably succeeded in obtaining chymically pure, at a single operation, so simple and abridged as to require only a quarter of an hour to purify several pounds of zinc:—Melt the zinc of commerce in a common crucible, and throw it into a tolerably deep vessel of water, taking care that the metal be very hot at the moment of running. This operation is not without its use, for the more granulated the zinc the easier it is purified. Dry the grains, and dispose them by layers in a Hessian crucible with one-fourth of their weight of nitrate of potash, using the precaution to place a slight excess at the top and at the bottom. Cover the crucible, and secure the lid, then apply heat: a vivid deflagration takes place with great disengagement of light, after which remove the crucible from the fire, separate the dross with a tube, and lastly, run the zinc into an ingot mould. This zinc submitted to Marsh's apparatus during entire days has never given any stain, and in solution the most sensible reactives—such as hydrosulphocyanic acid—have never indicated the least atom of iron.—*Journal de Pharmacie.*

ART. V.—*On the Proportions of Anhydrous Soda in Solutions of different Specific Gravities.*

*To the Editors of the Annals of Chymistry and Pharmacy.*

GENTLEMEN,—Some time ago I constructed for a practical purpose the enclosed table, which, as it may prove useful to some branches of manufacture, I beg to send for insertion in the ANNALS OF CHYMISTRY AND PHARMACY, should you deem it of sufficient importance or interest to your readers, or not superseded by one which may be, unknown to me, equally comprehensive and of higher authority. I have at the same time put in the table, in a separate column, that constructed by Dr. Dalton, some of whose numbers, you will perceive, rather differ. The only apology I have to offer for the difference is, that the numbers put down by me are what I found them to be by repeating the experiments with all the care I could command.

With sincere wishes for the success of your valuable publication,

I remain, Gentlemen, yours very respectfully,

L. T. M. NORMANDY, M.D.

16, Park Road, Dalston, Dec. 28, 1842.

TABLE OF THE PROPORTIONS OF ANHYDROUS SODA  
IN SOLUTIONS OF DIFFERENT SPECIFIC GRAVITIES.

| Sp. Grav. | Dry Soda.<br>Per Ct. | Dalton's Table.   | Sp. Grav. | Dry Soda.<br>Per Ct. | Dalton's Table. |
|-----------|----------------------|-------------------|-----------|----------------------|-----------------|
| 1.000     | 0.000                |                   | 1.270     | 18.0                 |                 |
| 1.005     | 0.396                |                   | 1.275     | 18.25                |                 |
| 1.010     | 0.78                 |                   | 1.280     | 18.50                |                 |
| 1.015     | 1.17                 |                   | 1.285     | 18.75                |                 |
| 1.020     | 1.566                |                   | 1.290     | 19.0                 | 19.0 boils 224° |
| 1.025     | 1.95                 |                   | 1.295     | 19.6666              |                 |
| 1.030     | 2.3                  |                   | 1.300     | 20.3                 |                 |
| 1.035     | 2.7                  |                   | 1.305     | 20.9998              |                 |
| 1.040     | 3.1                  |                   | 1.310     | 21.666               |                 |
| 1.045     | 3.5                  |                   | 1.315     | 22.3                 |                 |
| 1.050     | 3.9                  |                   | 1.320     | 22.9996              | 23.0 — 228°     |
| 1.055     | 4.3                  |                   | 1.325     | 23.375               |                 |
| 1.060     | 4.699                | 4.7 boils at 213° | 1.330     | 23.75                |                 |
| 1.065     | 5.0576               |                   | 1.335     | 24.1                 |                 |
| 1.070     | 5.4                  |                   | 1.340     | 24.5                 |                 |
| 1.075     | 5.77                 |                   | 1.345     | 24.875               |                 |
| 1.080     | 6.1                  |                   | 1.350     | 24.25                |                 |
| 1.085     | 6.49                 |                   | 1.355     | 25.6                 | 26.0 — 235°     |
| 1.090     | 6.7                  |                   | 1.360     | 26.0                 |                 |
| 1.095     | 7.1                  |                   | 1.365     | 26.375               |                 |
| 1.100     | 7.466                |                   | 1.370     | 26.750               |                 |
| 1.105     | 7.8                  |                   | 1.375     | 27.1                 |                 |
| 1.110     | 8.1                  |                   | 1.380     | 27.5                 |                 |
| 1.115     | 8.5                  |                   | 1.385     | 27.875               |                 |
| 1.120     | 8.9                  | 9.0 — 214°        | 1.390     | 28.25                |                 |
| 1.125     | 9.25                 |                   | 1.395     | 28.6                 |                 |
| 1.130     | 9.59                 |                   | 1.400     | 29.0                 | 29.0 — 242°     |
| 1.135     | 9.93                 |                   | 1.405     | 29.25                |                 |
| 1.140     | 10.276               |                   | 1.410     | 29.50                |                 |
| 1.145     | 10.6                 |                   | 1.415     | 29.75                |                 |
| 1.150     | 10.9596              |                   | 1.420     | 30.0                 |                 |
| 1.155     | 11.3                 |                   | 1.425     | 30.25                |                 |
| 1.160     | 11.6                 |                   | 1.430     | 30.50                |                 |
| 1.165     | 11.98                |                   | 1.435     | 30.75                |                 |
| 1.170     | 12.3                 |                   | 1.440     | 31.0                 | 31.0 — 248°     |
| 1.175     | 12.667               |                   | 1.445     | 31.5                 |                 |
| 1.180     | 13.0                 | 13.0 — 217°       | 1.450     | 32.0                 |                 |
| 1.185     | 13.4                 |                   | 1.455     | 32.5                 |                 |
| 1.190     | 13.6                 |                   | 1.460     | 33.1                 |                 |
| 1.195     | 13.9                 |                   | 1.465     | 33.5                 |                 |
| 1.200     | 14.2                 |                   | 1.470     | 34.0                 | 34.0 — 255°     |
| 1.205     | 14.5                 |                   | 1.475     | 34.466               |                 |
| 1.210     | 14.8                 |                   | 1.480     | 34.9                 |                 |
| 1.215     | 15.1                 |                   | 1.485     | 35.3998              |                 |
| 1.220     | 15.4                 |                   | 1.490     | 35.866               |                 |
| 1.225     | 15.7                 |                   | 1.495     | 36.3                 |                 |
| 1.230     | 16.0                 | 16.0 — 220°       | 1.500     | 36.7996              | 36.8 — 265°     |
| 1.235     | 16.25                |                   | 1.505     | 37.166               |                 |
| 1.240     | 16.50                |                   | 1.510     | 37.5                 |                 |
| 1.245     | 16.75                |                   | 1.515     | 37.8997              |                 |
| 1.250     | 17.0                 |                   | 1.520     | 38.266               |                 |
| 1.255     | 17.25                |                   | 1.525     | 38.6                 |                 |
| 1.260     | 17.50                |                   | 1.530     | 38.9998              |                 |
| 1.265     | 17.75                |                   | 1.535     | 39.3665              |                 |

TABLE—continued.

| Sp. Grav. | Dry Soda.<br>Per Ct. | Dalton's Table. | Sp. Grav. | Dry Soda.<br>Per Ct. | Dalton's Table. |
|-----------|----------------------|-----------------|-----------|----------------------|-----------------|
| 1·540     | 39·7                 |                 | 1·700     | 52·199               |                 |
| 1·545     | 40·099               |                 | 1·705     | 52·599               |                 |
| 1·550     | 40·666               |                 | 1·710     | 52·999               |                 |
| 1·555     | 40·8                 |                 | 1·715     | 53·39                |                 |
| 1·560     | 41·2                 | 41·2 boils 280° | 1·720     | 53·79                | 53·8 boils 400° |
| 1·565     | 41·587               |                 | 1·725     | 54·1769              |                 |
| 1·570     | 41·97                |                 | 1·730     | 54·55                |                 |
| 1·575     | 42·357               |                 | 1·735     | 54·9                 |                 |
| 1·580     | 42·7                 |                 | 1·740     | 55·0                 |                 |
| 1·585     | 43·1                 |                 | 1·745     | 55·38                |                 |
| 1·590     | 43·5                 |                 | 1·750     | 55·76                |                 |
| 1·595     | 43·9                 |                 | 1·755     | 56·1                 |                 |
| 1·600     | 44·2857              |                 | 1·760     | 56·5                 |                 |
| 1·605     | 44·67                |                 | 1·765     | 56·89                |                 |
| 1·610     | 45·057               |                 | 1·770     | 57·269               |                 |
| 1·615     | 45·44                |                 | 1·775     | 57·6                 |                 |
| 1·620     | 45·8                 |                 | 1·780     | 58·0                 |                 |
| 1·625     | 46·2                 |                 | 1·785     | 58·39                |                 |
| 1·630     | 46·6                 | 46·6 — 300°     | 1·790     | 58·776               |                 |
| 1·635     | 47·0                 |                 | 1·795     | 59·15                |                 |
| 1·640     | 47·4                 |                 | 1·800     | 59·5                 |                 |
| 1·645     | 47·8                 |                 | 1·805     | 59·9                 |                 |
| 1·650     | 48·2                 |                 | 1·810     | 60·28                |                 |
| 1·655     | 48·6                 |                 | 1·815     | 60·66                |                 |
| 1·660     | 49·0                 |                 | 1·820     | 61·0                 |                 |
| 1·665     | 49·029               |                 | 1·825     | 61·4                 |                 |
| 1·670     | 49·8                 |                 | 1·830     | 61·79                |                 |
| 1·675     | 50·2                 |                 | 1·835     | 62·17                |                 |
| 1·680     | 50·6                 |                 | 1·840     | 62·54                |                 |
| 1·685     | 50·999               |                 | 1·845     | 62·9                 |                 |
| 1·690     | 51·399               |                 | 1·850     | 63·3                 | 63·6 — 600°     |
| 1·695     | 51·799               |                 |           |                      |                 |

ART. VI.—*Hyoscyamia, or Hyoscyaminum, Hyoscyamine.*

HYOSCYAMINE may be classed among the organic combinations possessing alkaline properties. It is met with in *hyoscyamus niger* and *albus*; but on account of its being easily decomposed, it cannot be disengaged therefrom without some difficulty. It is capable of crystallizing. In the pure state it remains without odour, of a pungent taste, resembling that of tobacco; it does not change when exposed to the air, fuses on exposure to a slight increase of temperature, and may be distilled over by the application of an increasing degree of heat. It dissolves somewhat readily in water, spirit of wine, and ether. The aqueous solution has an alkaline reaction, and is gradually decomposed if exposed to the atmosphere. Tincture of galls precipitates it in white flakes; tincture of iodine produces a kermes-coloured precipitate; a solution of platina no precipitate. With acids it forms neutral salts, which are very poisonous, like the hyoscyamine itself; and if

applied to the eye, enlarges the pupil; less, however, than atropine. Hyoscyamine has not hitherto directly been employed for medical use, partly because it can only be obtained with considerable difficulty, and partly on account of *its great volatility*, and also because it is easier to obtain, provided care be observed, an extract of henbane, containing the whole of the efficient properties of hyoscyamine.—*Duflos's Pharmac. Chym.*

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ART. VII.—*Transformations of Cinnamic Acid.*

M. E. SIMON, states, in a communication to the *Annalen der Pharmacie*, that cinnamic acid is transformed into oil of bitter almonds by distillation with a mixture of sulphuric acid and *bichromate of potass*. If, on the other hand, cinnamic acid be distilled with three times its weight of slacked lime, a colourless volatile oil is obtained, much resembling benzine, partaking of the same composition, but which possesses entirely different properties, and probably also a different atomic weight. M. Simon calls it cinnamomine. Treated with fuming nitric acid, a substance is formed, which, by its taste and smell, resembles nitrobenzide, and which he calls nitro-cinnamide. A deeper investigation into these compounds would not be devoid of speculative interest.—*Berzelius's Report on the Progress of Science.*

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ART. VIII.—"Our Pharmacopœia."

**ACIDUM BENZOICUM.**—There are two processes for preparing benzoic acid; the first, by sublimation; and the second, by the moist way, as first pointed out by Scheele. The acid obtained by sublimation differs from the other in containing a less, but variable, quantity of essential oil; and since it is this latter acid more particularly to which the observations of medical men of former times refer, it would be only fair to admit it into the Pharmacopœias of the present day also. The *flores benzoës viâ humidâ paratâ* are chymically pure, and may be extracted from benzoic resin according to the formulæ given in the Pharmacopœias of Ferrara, France (of the year 1818), and Poland, by means of lime; whilst those of Prussia, Denmark, Edinburgh, Hanover, and Russia, direct the use of soda; and according to some Pharmacopœias of Southern Germany, by means of carbonate of potassa. The Pharmacopœias of London, Dublin, Amsterdam, Saxony, Würtemberg, Sardinia, and Spain, prescribe sublimation.

The directions given in our Pharmacopœia, notwithstanding their brevity, are far from concise. Every thing is left to the manufacturer, who must manage as well as he can, since no hints have been furnished for the purpose of facilitating the execution of the process. Further, a second sublimation is prescribed in

our Pharmacopœia, thereby diminishing the already not very plentiful product to a considerable extent.

I may, therefore, be allowed to particularize in detail those manipulations which produce with the greatest degree of certainty, and, *at a single sublimation*, a good preparation.

One pound of coarsely triturated benzoin is put into an iron pot with a flat bottom, whose diameter is from eight to nine inches; the benzoin forming therein a layer of from one to two inches in depth. The open end of the pot is then covered with a sheet of soft and loose blotting paper (felt, *Liebig*,) which is attached to the rim with paste. A cone, formed with strong and thick paper (cartridge paper), is then capped over the top of the pot, including the blotting paper; and this is also attached with paste and string. The apparatus thus prepared is then placed on the sand-bath and exposed from four to six hours to a gentle heat. After this lapse of time the vessel is removed from the sand-bath, inverted, the string detached, and beautiful white needles, of a silky lustre, possessing the agreeable odour of benzoic acid, will then be found in the paper cone.

Benzoic acid thus prepared is not perfectly free from essential oil; but it does not contain any quantity amounting to an impurity of this latter. By following the method just described the blotting paper absorbs the excess of oil while the fumes of benzoic acid are passing through it; and at the same time it prevents the benzoic acid already sublimed from repeatedly falling back into the fused resin, which would thereby continually cause the repetition of the sublimation, and, consequently, decomposition of the acid. It likewise protects it from the radiating heat emanating from the bottom of the vessel, and thus facilitates the condensation of the fumes. All these advantages are attained by the above very simple process. From one pound of the above resin one ounce of benzoic acid is obtained; whereas, by the moist way, about half as much only is procured.\*

The tests given in our Pharmacopœia are not sufficiently precise, since what has been therein stated, in reference to benzoic acid, also applies to hippuric acid. It is stated, that "if carefully treated, it should evaporate completely with a peculiar odour;" rather it should have been, with the odour of benzoin.

\* This depends very much on the quality of the benzoin used, which varies exceedingly (at the present moment being rather scarce) from £40 to £50 per cwt. The makers with whom we are acquainted are Messrs. Bailey, of Wolverhampton, and Mr. Fowler, of Covent Garden. The low price at which the acid has for some time past been sold, is far from commensurate with the variation of the product; in one case, we were informed, a maker, after calculating the cost, found, on subliming half a ton of the resin, that he had realised 2s. 8d. A large quantity, and that of the very finest quality, of benzoin is exported to Spain, being used as incense, with oil-banum, &c. Benzoic acid is, at the present moment, owing to the scarcity of the resin, very dear (comparatively speaking), being 1s. 8d. per ounce; it usually averages, wholesale, 1s. 1d. to 1s. 2d. per ounce.—Ed.

Hippuric acid also evaporates with a peculiar odour—far from pleasant, however—rather disagreeable, indeed, and narcotic. The hippuric is an acid containing azote. When heated, it exhales ammonia and hydrocyanic acid, being, at the same time, converted chiefly into benzoic acid. The same transformation takes place if hippuric acid is boiled with nitric or sulphuric acid. Since pure benzoic acid manufactured from hippuric acid possesses no chymical properties by which it may be distinguished from that manufactured from benzoin, it is scarcely possible, under such circumstances, to discover the adulteration of genuine benzoic acid with this (artificially prepared benzoic) acid. Fortunately, however, adulterators seldom give themselves the trouble of perfectly purifying the benzoic acid made from urine; and, in that case, the suspected compound, sublimed, evolves a disagreeable urinous odour, betraying its presence. Hippuric acid, as is generally known, is manufactured from the urine of the horse, which is evaporated to one-eighth of its original volume, and then mixed with muriatic acid; after which, although still somewhat impure, it deposits in the form of a crystalline powder. Since, on the one hand, hippuric acid can be changed into benzoic acid by various means; so, on the other, can benzoic acid be transformed into hippuric acid, as after being introduced into the body, when it passes through the channels of digestion. The ready inference is, that horses and other graminivorous animals consume benzoic acid with their food, and then transform it into hippuric acid during digestion. The subsequent inference, however, is erroneous, if, as Dr. Alex. Ure, to whom we are indebted for the above observation, supposes that the formation of hippuric acid is carried on at the expense of the uric acid, because, on an average, the same quantity of uric acid is found in the urine of an individual, whether such individual may have consumed benzoic acid or not. ULEX.

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ART. IX.—TOXICOLOGY—*The Natural History and Uses of Fungi.*

(For the Annals of Chymistry and Practical Pharmacy.)

THE class of Mushrooms can scarcely be considered as at present furnishing any valuable medicament to our Pharmacopœia, yet to the medical man they must needs possess no inconsiderable interest, on account of the poisonous qualities of many of the tribe. In other times, some species of Agarici were in use as cathartics; and in a Pharmacopœia, published in 1769, by Dr. Quincy, two species are described as having aperient qualities; but, in the present day, their sole use is as a styptic. For this purpose the *Agaricus Muscarius*, or *Ignarius*, is steeped in a

solution of nitrate of potash and dried, in which state it is familiarly known as Amadu, or German Tinder.

Mushrooms (Fungi) possess, as has been already observed, considerable toxicological interest. They constitute a very numerous class of plants, amounting, all sorts included, to many hundreds. They are met with in every quarter of the globe. The reddish mushroom, or *Agaricus muscarius*, is a common poisonous species in England; while we find, from Langsdorff, that the musho-more of Kamschatka, of which travellers have told such strange stories, is but a variety of our common indigenous mushroom; which is common, also, in every country between the Atlantic and Bahrings's Straits. The common mushroom, or *Agaricus campestris*, again, for another example, has been found in every part of Europe, in Lapland as well as Italy; all over Asia as far as Japan; in Africa, as is asserted by Pliny, confirmed, also, by modern authority; and, according to Mucklenberg, in America. The greatest number of fungi are, at least in this country, considered poisonous. In fact, at English tables are scarcely met with more than three or four species, out of at least two dozen kinds of esculent mushrooms growing in this country. There is no doubt, however, that our apprehensions of this class of plants greatly exceed a just measure. Travellers of great credit assure us, that in many parts of Europe, more especially in the Russian dominions, almost all sorts are eaten with impunity. Pallas, indeed, assures us, that in many forest districts of Asiatic Russia, in which fungi abound, the people feed, during Lent, exclusively on bread and fungi, and that they eat all kinds except the *Agaricus muscarius*, the fetid dunghill mushroom, and some other juiceless sorts; and we have it, too, on good authority, that, in the Tuscan markets, no less than one hundred different species are found on sale. But the inference to which these different statements would lead are as much beside the mark, in all probability, on the one hand, as are the prejudices of the English people on the other; and there can be no doubt that amongst the most virulent of the vegetable poisons must be numbered a large proportion of the fungi tribe. They are very extensively used in foreign countries, and have been much prized by the epicures of past ages. They likewise figure in the narratives of historians, both natural, political, and biographical. Numerous deaths, either accidental or criminal, are recorded by ancient writers. In recent times, numerous instances have been given of fatal consequences resulting from their use, especially in France, in the vicinity of the capital of which kingdom the fungi tribe abound; so that, in the Annals of French Medicine, we find recorded not less than one hundred deaths from mushrooms alone, in the course of the thirty years

intervening between 1749 and 1783, and all occurring in Pais and its vicinity.

It has already been mentioned, that a large proportion of the mushroom tribe is probably poisonous; perhaps, we may say, that the greater part is unsafe food for man. Orfila,\* whose account is generally considered the best, only particularly describes twenty species of noxious mushrooms, which he denominates as follows:—

- |                                             |                                |
|---------------------------------------------|--------------------------------|
| 1. Amanita pseudo-aurantiaca; or, muscaria. | 11. Hypophyllum Tricuspidatum. |
| 2. Amanita venenosa.                        | 12. Hypophyllum capula.        |
| 3. Amanita bulbosa.                         | 15. Hypophyllum pudipundum.    |
| 4. Amanita litrina.                         | 14. Agaricus Ureus.            |
| 5. Amanita Viridia.                         | 15. Agaricus pyrogulus.        |
| 6. Hypophyllum Crux Meliteuse.              | 16. Agaricus Acris.            |
| 7. Hypophyllum Sanguineum.                  | 17. Agaricus Stypticus.        |
| 8. Hypophyllum Celliteum.                   | 18. Agaricus Unnularius.       |
| 9. Hypophyllum Maculatam.                   | 19. Agaricus Necator.          |
| 10. Hypophyllum Albocitrinum.               | 20. Agaricus Lactifenes.       |

The greatest part of our knowledge of these is due to Paulet, who alone has made any considerable number of experiments on mushroom poisoning, most of them on dogs and beasts, but some of them on his own person. On all animals they seem to act as energetic poisons; and in every shape in which they have been tried, whether in the natural condition, or dried, or after long maceration, the watery extract, an expressed juice, an alcoholic, an ethereal, and an acetic tincture, have proved equally poisonous. The application of the mushroom poison to the serous membranes, cellular tissue, substance of the viscera, &c. does not appear to have been tried by Paulet; but, from a few experiments which were made on rabbits and other animals, they appear to be proportionally active when these methods are employed.

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ART. X.—*Fritsche's Process for obtaining the pure blue colouring-matter of Indigo, and Tests for ascertaining the quantity thereof contained in different species of Indigo.*

IF indigo be treated with a solution of caustic potassa in spirit of wine, a small quantity of peculiar indigo blue is obtained in the form of scales. The process is based on the reduction of indigo; for which purpose spirit of wine is employed instead of water, as used in the old process, and in lieu of the substances employed in other cases for effecting this reduction, sugar of grapes is substituted, on account of its solubility in alcohol; for the same reason the lime is replaced by caustic potassa or caustic soda.

One part of commercial indigo, with one part of sugar of

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\* *Leçons de Médecine Légale*, sect. 67.



grapes, is placed in a bottle capable of containing forty parts of liquor. The bottle is half filled with boiling alcohol, and the other half with alcohol previously mixed with  $1\frac{1}{2}$  parts of a very concentrated ley of caustic soda. The bottle being thus charged, is strongly agitated, and then left to stand quietly for some time. After the liquid has become bright, it is drawn into another bottle by means of a syphon. The liquor thus obtained, whilst protected from contact of air, is of a yellowish-red colour, and so dark that it appears transparent only when in thin layers. As soon, however, as it is exposed to the influence of oxygen it becomes purple, and quickly passes through the different tinges of red, violet, and blue, whilst the whole of the indigo blue is deposited in the form of scales. This is obtained as a very fine, light, crystalline powder; whilst all the other substances contained in commercial indigo either remain undissolved at the commencement, or remain in solution while the blue colouring-matter is depositing. After the indigo blue has been placed on a filter and washed with a little alcohol, it remains only to be washed with water, and this is easily and speedily effected. On the crystals, minute globules, of a substance insoluble in alcohol, are commonly deposited, which, however, easily dissolve in water, and are produced, by the action of caustic soda, on the grape sugar.

Out of four ounces of a very indifferent sort of indigo two ounces of pure indigo were obtained, by the first treatment, in the manner just stated. The residue, subjected for a second time to similar treatment, yielded only one drachm more of indigo blue, and the residue then remaining contained only a very slight quantity of colouring matter. This process, for testing the quality of commercial indigo, is doubtless preferable to any other.—*Echo du Monde Savant*, Oct. 1842.

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ART. XI.—*Elementary Course of Pharmacy, chiefly from the German of P. A. Cap and Rudolph Brandes, collated with the Works of Phæbus, Soubeiran, Guibourt, Lecanu, Duflos, Gmelin, &c. &c.*

[Continued from page 440.]

§ 23. Neither can he safely neglect the cultivation of the art of expressing himself accurately either in writing or conversation. He should accustom himself to clothe his ideas in suitable and happy terms, endeavouring to convey his meaning with perspicuity, precision, and elegance. He may hope one day to instruct other pupils, to occupy perhaps the chair of public lecturer, or it may occur some important appointment may fall to his lot—thus introducing him into the ranks of the learned; or, following the example of so many celebrated foreign chymists, it may

be his fortunate lot to enrich science with the fruits of his labour. "Style forms the man," says Buffon : and much might be added in praise thereof. Precision in the choice of expression is generally characteristic of a good education. As to philosophy, its study cannot but be useful to him who carries in his hand such powerful means to good or evil, and to whom the health and life of his fellow-creatures is entrusted. His title (diploma we rust it will be in a few years,) will afterwards be the guarantee of his scientific attainments. But what can be said of the honesty of that man who has not found in the serious consideration of his duties to God, to society, and himself, a strong mental guard against the seductions of greedy covetousness, perhaps more dangerous than the haughty self-esteem of ignorance ?

Let us, then, first direct our attention to character, by striving to form an honest man, and afterwards consider the best means for rendering him a learned one. Although in our vocation, as Cabanis said, honesty has no other superintendent than itself, our own conscience being a severe monitor ; nevertheless, that conduct which has integrity for its guide will be rewarded with the confidence of the public, and far surpasses the renown of scientific attainments and skill. Honesty, capacity, and scientific attainments, should, however, be united : they form the ideal, the stamp and symbol of perfection, to attain nearer and nearer which is the task of our vocation. It is true, to quote the words of Geiseler, imagination thus occupied may exceed the limits of reality, and may form to itself an ideal approaching to the verge of improbability ; but this view of the question is at any rate hastily taken, because the material for such ideas is taken from reality ; whilst those different traits which are met with in the world separate and scattered, are, by our imagination, united in one *ensemble* of beauty, grandeur, and perfection ! And we may add, that the history of our science is rich in instances of worthy men who represent an ideal pattern, worthy the imitation of our junior fellow-students.

Moreover, why should not this branch of an art, distinct in principle as in object, be ranked, in a moral point of view, superior to others, which it surpasses when observed in its scientific bearings ? We are far from believing that less ability, intellect, skill, knowledge, and integrity, are requisite for fulfilling the high task of pharmacy than is required for any other branch of medical science. It is indisputable that one of the most important results of persevering study is the power and facility of daily acquiring fresh knowledge : this is one of the characteristics of men of superior intellect ; whilst the mark of an inferior mind is to remain stationary. This capacity for improvement is indispensable in the cultivation of science, because it is daily progressing. The various sciences have more points of connexion

than is generally supposed. Lastly, the honour as well as the interests of chymists requires them to maintain and to raise the dignity and importance of their art in the estimation of the public. This object will be attained not only by such knowledge as is peculiar to their vocation, but also, and chiefly, by extensive attainments; these furnish a proof of being on a footing of equality with all who are engaged in the scientific professions, and afford similar claims to estimation in the minds of the enlightened classes of society.

We request our younger fellow-students to weigh these remarks, to bear them in mind, and act up to them. They are introduced here for the purpose of directing them on the journey of life which they are about to enter, and whose commencement is dated from their first step in a pharmaceutical career. Unless they possess an ambition desirous of maintaining this *esprit de corps*, we fear they will fail in attaining the high aim of their vocation.

§ 24. *Pharmaceutics* : may be defined as a complete system of that knowledge which is connected with the art of preparing remedies.

*Pharmacy* : is the art of preparing remedies. It comprehends all those facts and principles which this art borrows from the different sciences, or which it derives from experience, and applies them to the preparation of remedies.

§ 25. The distinction between pharmaceutics and pharmacy requires, perhaps, some explanation. The term pharmaceutics involves the expression of a science, or rather a series of sciences; pharmacy is an art; strictly understood, merely a branch of pharmaceutics, since this latter includes not only the facts and theories of the different sciences which have reference to remedies, but also those very sciences themselves, to the full extent of their fundamental doctrines. Thus, chymistry, physics, and natural history, cannot be termed branches of pharmacy, but obviously they are branches of pharmaceutics.

The druggist, strictly speaking, need be conversant only with those branches of science necessary for the preparation of remedies; but if he claims the position of a scientific man, or of a teacher or professor, who devotes himself to the perfect comprehension of the details of the pharmaceutical art, attentively interested in its progress, he must, of course, be acquainted with all the details of those sciences on which his science is based, and the advances which they make. This division into pharmaceutics and pharmacy answers essentially to the division of pharmacy, hitherto understood by the terms *theoretical* and *practical pharmacy*.

§ 26. Any natural substance modified by art, either by mixing or combining it with another, so that it may be applied in-

ternally or externally for the purpose of removing disease, is termed a *medicine*. The expression *remedy* has a more extensive signification. There are many remedies, not being medicines; as, physical remedies, diet, the scalpel of the surgeon, bandages, &c.

The substances destined as medicines for the curative art, previous to undergoing the necessary changes whereby they become fitted for the purposes of medicine, are termed *drugs*. When they have undergone such changes, they are termed *preparations*, especially when the changes referred to are produced by chymical operations.

§ 27. It appears from the preceding explanation, that pharmacy consists essentially of two parts. These are,—

1. The knowledge of drugs, or *materia medica*.
2. The preparation of medicines.

To these may be joined two minor branches; one preliminary, and the other secondary. The former of these refers to the *selection or collection of drugs*; the latter to the *preservation of medicines*.

§ 28. A knowledge of drugs is first obtained by the practice of examining their external relations under different points of view; it is, therefore, entirely *empirical*: and, afterwards, by the study of their peculiarities, whereby they are traced to those different parts of natural history to which they belong, or where-with they are connected. This information may be acquired during the period occupied chiefly in practical operations. During apprenticeship, it is true, the information gained on this head is usually very imperfect; but much may be learned from the continual hints of the master, both during the time of business, and at other convenient hours. This knowledge is then perfected during the time devoted more especially to the more advanced studies.

The history of drugs, or those substances used for the purposes of medicine, is likewise termed *pharmaceutical* or *medical natural history*; and divided, according to the three kingdoms, into *pharmaceutical zoology*, *pharmaceutical botany*, and *pharmaceutical mineralogy*.

§ 29. The preparation of medicines (*preparatio*) consists of four principal parts:—*division* (*divisio*), *extraction* including digestion (*extractio*), *mixture* (*mixtio*), and *chymical combination* (*combinatio*). The products of these operations may, therefore, be accordingly be divided into four classes,—*division*, *extraction*, *mixture*, and *combination*.

The two latter classes were formerly termed by other names; mixtures, were called *Galenical*, and combinations, *chymical medicines*.

There are several other divisions of medicines according to the point of view in which they are considered. Thus they are

divided into *simple (simplicia)*, and *compound* medicines (*composita*), according as they consist of one or more substances ; further, according to the kingdoms of natural history, into *animal*, *vegetable*, and *mineral* medicines ; and lastly, a general division is derived from the time the medicines may be prepared, by distinguishing *officinal* medicines (*officinalis*), those which are prepared in advance, and are not much altered by time ; *magistral* medicines (*magistralia*), those which do not keep, easily spoil, or are prepared *ex tempore* from the prescription of the physician.

These divisions are of great utility in treating of remedies. We shall repeatedly advert to them, and in the course of this work frequently avail ourselves of the opportunity of expressing our opinion as to their value, purity, &c.

§ 30. We now beg to furnish a short survey of the course to be pursued in acquiring a knowledge of the different objects of pharmacy :—

#### A. PERIOD OF APPRENTICESHIP.

*1st Epoch.* Nomenclature and classification of medicines.

Primary operations. Selection and collection of drugs.

Medicines obtained by division (*divisio*), powdering, rasping, slicing, &c.

*Secondary Operations.*—Medicines obtained by extraction, including digestion, *extracts*, tinctures, infusions.

*2d Epoch.* Medicines of the third class—*mixtures*, processes, and products.

*Works to be performed in the Laboratory.*—Preservation of medicines.

*3d Epoch.* Medicines of the fourth class—*combinations*, processes, and products ; magistral, pharmacotechnic, preparation of prescriptions, *dispensing*.

#### B. PERIOD OF IMPROVEMENT.

Natural History :—

Mineralogy

Botany

Zoology.

General Physic.

Chymistry :—

Universal chymistry

Toxicology

Analysis

Chymical manipulation

Knowledge of drugs, or *Materia Medica*.

Having thus introduced the apprentice to the field which lies before him, we will commence our labours together in our next, a task which will, we trust, afford him more information, while for ourselves it will necessarily possess a greater degree of interest than the mere narration of the systematic course we found it necessary to lay down.

[To be continued.]

## CHYMISTRY APPLIED TO AGRICULTURE.

### ART. XII.—*Apatite.*

*To the Editors of the Annals of Chymistry and Pharmacy.*

GENTLEMEN,—In reply to the letter of AGRICOLA, which appeared in No. 10 of your useful and excellent publication, I beg leave to furnish a few particulars, in reference to the mineral Apatite, as requested by your correspondent.

Setting aside the notice taken of Apatite in different works on mineralogy, the first useful mention of it appears in a work on fertilizing, written by Cuthbert W. Johnson, Esq., decidedly the best book we have on manures. It was published in 1839.

Shortly after its publication, I addressed a letter to John Gordon, Esq. of Liverpool, requesting him to import some, by way of trial. This gentleman was obliging enough to make the attempt; but the mineral shipped from Spain was not Apatite, but proved, on analysis, to be impure Chalk. I have not heard whether Mr. G. has since been successful in that attempt.

It is stated that Sprengel, the agricultural chymist, has tried it with decided advantage; and, I believe, Mr. Phillips has also tried some experiments at the request of Mr. Pusey. The mineral is to be found, in great abundance, in Estremadura, in Spain.—I remain, Gentlemen,

Your most obedient,

Jan. 3, 1843.

A HAMPSHIRE FARMER.

### ART. XIII.—*Products of Decomposition on Surface of the Earth.*

[Continued from page 446.]

#### HUMINE—HUMIC ACID (GEINE AND GEIC ACID).

AFTER having treated the aqueous extract with water, the residue is treated with muriatic acid. This dissolves the lime and magnesia; perhaps also a small quantity of alumina and oxide of iron. After this treatment, a solution of potassa will now dissolve from the residue (left after treating with muriatic acid), a large portion of humic acid, which was previously combined with the bases eliminated by the muriatic acid. There invariably remains, even after the action of the alkali, a black or brownish-black matter, which is found mixed with the inorganic components of the soil, which has received the name of humic charcoal, or carbonaceous mould. This substance, in all probability, is merely an indifferent modification of humic acid; that is to say, humine.

#### HUMIC ACID AND HUMINE (GEIC ACID AND GEINE).

These two modifications of the same substance are found in mould; but it appears that humine exists therein, under two modifications, one of which is easily converted into humic acid, under the influence of bases, whilst the other maintains its indif-

ferent state. We will now narrate the experiments which have been made on humine and huminic acid ; that the huminic acid obtained by the action of dilute acids on sugar, is most likely an impure acid, mixed with crenic and apocrenic acids, and perhaps with various other bodies ; so that the more recent experiments that have been made with pure humic acid will furnish results which differ in many points from those I am about to relate. In the state in which humic acid is met with in the earth, it appears to be a body altogether neutral, has no reaction, either acid or alkaline, and does not affect litmus paper. It is slightly soluble in water, which it colours of a pale yellow, still less soluble in alcohol, and insoluble in ether. Exposed to the action of heat it takes fire, burns at first with a flame, then without flame, like *amadou*, or German tinder, yielding a peculiar odour, somewhat similar to that of turf during combustion. Submitted to dry distillation it is decomposed, yields a charcoal having a metallic lustre, amounting to half its weight, some empyreumatic oil, an acid water containing acetic acid, and sometimes ammonia, carburetted hydrogen, and a little carbonic acid gas.

[To be continued.]

## PRACTICAL PHARMACY.

### ART. XIV.—*Remarks on some Pharmaceutical Preparations of Lobelia Inflata.* By W. PROCTER, Jun.

THE only preparation of *Lobelia inflata* which has been recognized by the Pharmacopœia is the tincture. It has been generally admitted, both by Thomsonians and others, that heat exercises an injurious influence on the activity of this plant ; and hence preparations in which heat is requisite have been necessarily dispensed with. In some observations of a chymical character on this plant, published in the thirteenth volume of the Journal of Pharmacy, the writer demonstrated several of the conditions under which this change by heat takes place, and showed that while the active principle in a free state was readily destroyed by heat, when it was in saline combination with an acid, it was capable of being subjected to a heat of 212° Fahr. without injury.

Any one may be satisfied of this, by making two decoctions of *Lobelia*, into one of which a small quantity of carbonate of potassa is thrown, and into the other as much acetic acid. The former will possess none of the peculiar acrimony of the plant ; the latter all.

The object of this communication is to take advantage of the above suggestion in making several pharmaceutical preparations which require heat in their formation. It is believed that

*Lobelia inflata* has yet to receive from professional men that share of attention which it deserves, and it is hoped, by presenting to the practitioner the virtues of the plant in a condensed form, that he will take up the subject.

*Acetous extract of Lobelia inflata.*

Take of Lobelia seed, bruised, eight ounces.

Diluted Alcohol, four pints.

Acetic Acid, one fluid ounce.

Macerate the bruised seed in the diluted alcohol, to which the acetic acid has been added for forty-eight hours, and then throw the whole on a displacement filter, and, after the liquid has ceased to pass, add sufficient diluted alcohol that four pints of tincture shall be obtained. Evaporate this by means of a water bath, until it attains the consistence of an extract. The product thus obtained is about one-eighth of the seed employed. In this form (as a pill) *Lobelia* can be administered without that peculiar disagreeable effect upon the fauces, so characteristic of its exhibition in the form of tincture.

*Vinegar of Lobelia inflata.*

Take of Lobelia, in powder, four ounces.

Diluted Acetic Acid, or distilled Vinegar, a pint and a half.

Macerate the Lobelia in the dilute acid for twelve hours, and subject it to displacement on a proper filter, until twenty-four fluid ounces are obtained.

*Syrup of lobelia inflata.*

Take of Vinegar of Lobelia six fluid ounces.

Sugar, twelve ounces.

Dissolve the sugar in the vinegar by the aid of heat, remove the scum which rises, and strain.

The oxymel may be prepared from the vinegar in the same manner as oxymel of squills; and a combination of the two has been highly spoken of by a physician of this city in catarrhal affections.

In making an infusion, lobelia, some acid—vinegar, for instance—should always be added.—*American Journ. of Pharm.*

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ART. XV.—*Notice respecting a new Hyponitrous Ether from Pyroxylic Spirit.* By DR. ROBERT HARE.

DR. HARE made an oral communication respecting a new ethereal liquid which he had succeeded in obtaining.

He mentioned that he had procured by means of hyponitrite of soda, diluted sulphuric acid, and pyroxylic spirit, an ethereal liquid in which methyl ( $C_2 H_2$ ) might be inferred to perform



the same part as ethyl ( $C_2H_5$ ) in hyponitrous ether. In fact, by substituting pyroxylic spirit for alcohol, this new ether was elaborated by the process for hyponitrous ether, of which he had published an account in the Society's Transactions, Vol. vii. Part 2.

The compound which was the subject of his communication had a great resemblance to alcoholic hyponitrous ether, similarly evolved, in colour, smell, and taste; although there was still a difference sufficient to prevent the one from being mistaken for the other.

Pyroxylic spirit appeared to have a greater disposition than alcohol to combine with the ether generated from it, probably in consequence of its having less affinity for water. The boiling point appeared to be nearly the same in both of the ethers; and in both, in consequence of the escape of an ethereal gas, an effervescence, resembling that of ebullition, was observed to take place at a lower temperature than that at which the boiling point became stationary. The ethereal gas, of which Dr. Hare had given an account in his communication respecting hyponitrous ether, seemed to have escaped the attention of the European chymists; and, even after it had been noticed by him, seemed to be overlooked by Liebig, Kane, and others, in their subsequent publications.

Dr. Hare attached the more importance to his success in producing the ether which was the subject of his communication; since, agreeably to Liebig, no such compound exists, and it is to be inferred that efforts to produce it had heretofore failed. It was presumed that this would excite no surprise, when the difference was considered between the consequences of the reaction of nitric acid with pyroxylic spirit, and with alcohol.

The liquid last mentioned is now viewed as a hydrated oxide of ethyl, while pyroxylic spirit is viewed as a hydrated oxide of methyl. When alcohol is presented to nitric acid, a reciprocal decomposition ensues. The acid loses two atoms of oxygen, which, by taking two atoms of hydrogen from a portion of the alcohol, transforms it into aldehyd; while the hyponitrous acid, resulting inevitably from the partial deoxidizement of the nitric acid, unites with the base of the remaining part of the alcohol. But when pyroxylic spirit is presented to nitric acid, this acid, without decomposition, combines with methyl, the base of this hydrate; so that, as no hyponitrous acid can be evolved, no hyponitrite can be produced. Thus, in the case of the one, there can be no ethereal hyponitrite; in that of the other, no ethereal nitrate.

Dr. Hare regretted that Liebig should not have been informed of the improved process for hyponitrous ether, to which he had referred in commencing his communication. Instead of recommending a resort to the process, it was advised that the fumes

resulting from the reaction of nitric acid with *secula* should be passed into alcohol, and the resulting vapour condensed by means of a tube surrounded by a freezing mixture.

This process Dr. Hare had repeated, and found the product very inferior in quantity and purity to that resulting from the employment of a hyponitrite. In this process, nascent hyponitrous acid, as liberated from a base, is brought into contact with the hydrated oxide. In the process recommended by Liebig, evidently this contact could not take place; since it was well known that hyponitrous acid could not be obtained by subjecting *secula* and nitric acid to distillation, and condensing the aeriform products \*.—*Proceedings of the American Phil. Society.*

#### ART. XVI.—*Priessnitz and the Water-Cure.*

(For the Annals of Chymistry and Pharmacy.)

HAHNEMANN, the founder of homœopathy, laid down, as his maxim, *similia similibus curantur*. Such was the base of his system, which he supported by an excellent diet, aided by an implicit faith in his infinitesimally divided doses of medicine. His doctrine, although erroneous, and bidding defiance to any reasonable inference, deceived many, and obtained followers in all countries; but it has now passed its culminating point. Many who formerly defended it with the utmost eagerness, are now deserters, and have passed over to the standards of Allopathy; others deviate from him in most essential points; whilst fashion, which gave a transient reign to his method, threatens to destroy it entirely, especially at the present moment, having now another favourite. The topics of every day's conversation are no longer the marvellous cures produced by homœopathy, but those effected by hydropathy.

In a wild and romantic part of the Riesengebirge (Giant Mountains), of Austrian Silesia, there is a miserable unimportant village, called Gräfenberg—a place, the existence of which ten years since was scarcely thought of by any one, but which now, however, is known even to children, having become the Eldorado

\* The process alluded to is as follows :—Seven parts of acid, eight parts of alcohol, fourteen parts of water, and fourteen of hyponitrite being prepared, add seven parts of water to the salt and seven to the acid, and allow the mixture to cool. The saline solution and alcohol are introduced into a tubulated retort, of which the recurved and tapering beak enters a tube, which occupies the axis, and descends through the neck of an inverted bell-glass, so as to terminate within a tall phial. Both the tube and phial must be surrounded by ice and water. The diluted acid is then added gradually. A water-bath, blood warm, is sufficient to cause all the ether to come over.

Agreeably to another plan, the materials, previously refrigerated by ice, are introduced into a bottle also similarly refrigerated. Under these circumstances the ether soon forms a superstratum which may be separated by decantation.

This last mentioned process does not answer so well for the hyponitrite of methyl, on account of the pyroxylic spirit being prone to rise with the ether. Yet the spirit may be separated from the ether by anhydrous chloride of calcium.

for incurables, and a place of refuge for the diseased of every rank and nation. There lives the highly extolled and much lauded Priessnitz, the originator of the water-cure. His life proves, in a striking manner, how esteem and renown may fall to the lot of an individual, and how it is possible to become very rich without its being necessary to sacrifice in any way at the altar of the capricious goddess.

Priessnitz, the son of simple peasants, has enjoyed only a scanty education, never having left Gräfenberg. He can read ; but writes and reckons with difficulty. With his father he tilled the soil, and continued this occupation after the death of the former. It so happened that he sometimes received visits from a workman of some neighbouring iron-factory, who was in the habit of applying rags moistened with cold water to the wounds which he sometimes received in the practice of his calling, thereby affecting a speedy cure. Priessnitz recommended these means, gave directions for their application, and hence it occurred that wounded persons frequently addressed themselves to him, and asked for his advice. As Priessnitz usually commenced his cure by cleansing the wound with a sponge, he received the name of Schwammel Doctor (sponge-doctor), by which euphonious appellation he became known in the neighbourhood. The renown of his cures spread so widely, that, in the year 1826, some patients sought him out at Gräfenberg. They were scarcely able to find shelter—accommodation was quite out of question. As Priessnitz then cultivated the soil during the day, and in the evening only attended to his visitors (and such was his practice until 1834), his patients suffered exceedingly from weariness, and, in order to shorten the time, they thought of various methods of multiplying the application of water as a remedial power, procured bathing-tubs, planned walks through the forest, conducted springs by the same channel, forming brooks, surrounding them with hedges, and arranged these so as to fall from the sides of the rocks, thus enabling the patients to take a douche-bath, &c. All these tasks were executed without much assistance on the part of Priessnitz. The execution, however, of these works of absolute toil, even for a labouring man, excited the appetite of the patients, which was increased by the fresh air of the mountains ; the stagnant fluids, especially of the hypochondriac and others suffering from disorders in the bowels, were brought into animated and beneficent circulation. The people found themselves benefitted, returned cured, and never grew weary (simple souls !) of proclaiming the praises of the establishment. The influx of visitors increased from year to year ; and at present there are annually from 1000 to 1200 visitors ; and among them persons of high, aye, the highest rank, who do not object to undertake a journey of more than 500 miles in search of health.

Priessnitz is now entirely at the service of his visitors; his former field merely furnished him with golden ears, but from the field he now cultivates he reaps solid gold.

He speaks but little, yet what he says is as Sir Oracle, for his visitors receive his dicta with full credence, and follow them strictly. Necessarily, from not being acquainted with the human body, and its diseases, by scientific study, he recommends to all, one and the same cure, and the same diet; notwithstanding which his patients are satisfied.

The chief point of his method of cure consists in producing a crisis: for thus he terms an eruption, which, after the water-cure has been continued for some weeks, sometimes appears only on certain parts of the body, and at others almost entirely covering it. According to Priessnitz's theory, by this crisis the disease, whatever it be, lodged in the body, forces its way out, and is expelled; and not merely the disease, but at the same time the medicines, which years since may have been employed for attacking such disease; and these are one and both disengaged by the eruptions which form on the body. Thus he affects to distinguish mercurial and sulphureous eruptions; and he once applied the expression to one of his patients, "that lime was expelled from his hands by perspiration." We shall afterwards perceive that these crises are produced by a much less wonderful cause: that they are merely the result of the over-excitement of the skin, produced by incessant friction. The lime pretended to be expelled by perspiration, is nothing but the decayed skin of the hands, which, continually kept wet, finally peels off, as instanced in the (macerated) hands of the laundress.

We now proceed to describe the life and occupation of the visitors of Gräfenberg, day by day, for weeks, months, and even for years:—

In the morning, at four or five o'clock, the bathing attendant appears, and wraps the patient up in a large linen sheet dipped in cold water, with which he rubs the back part of the body for full a quarter of an hour, and longer, whilst the patient himself performs the same operation on the forepart of his body. Being thus gradually dried by violent rubbing, the patient then bathes his head, by placing one side of it in a basin filled with cold water, whilst the bather pours the same liquid over the other side by means of a sponge, after which the reverse side is submitted to a similar treatment. This operation also lasts for a quarter of an hour. Whilst the head is being rubbed dry the patient takes a sitting bath, in which he likewise passes a quarter of an hour, in a somewhat ridiculous and fatiguing position. The patient then puts on all the sore parts of his body, which may be covered with eruption (crises), wet rags of linen, thus affording the most pitiable appearance, dresses himself lightly, and without any strict attention to his toilette; puts a tumbler into his pocket, and

walks up and down through the mountains, from one spring to another, taking at each of them a good draught of the generous liquor, until his body becomes swollen to the size of a Turkish drum.

About eight or half past eight o'clock breakfast is served, consisting of sour and sweet milk, of fresh and salted butter, black bread, and water. The supper is of the same kind, only that during the winter potatoes are added. It would scarcely be supposed that a stomach, thus filled to repletion with water, would be still capable of consuming such large quantities of bread, milk, and water, as really is the case.

After breakfast, the patients again resort to their promenades through the mountains, and water drinking; any other occupation requiring physical strength, as barking wood, hewing down trees, binding faggots, &c. is permitted and practised, and even princes may be seen armed with axe and saw.

About eleven o'clock the patient is again wrapped up in wet linen and rubbed, takes a second head-bath, followed by that taken sitting, and covers the belly, the crises (or eruptions), and painful parts of the body, with wet rags, puts his clothes over them, takes another short walk, and repairs, at the sound of the dinner-bell, to the dining-room.

Dinner consists of weak broth, hard and tough beef, vegetables, and pudding, three times a-week, and the other days roast-meat, all provided in abundance. The dishes are attacked with indescribable eagerness; the food is not eaten, but devoured. This might, at a first glance, be considered as a favourable symptom, and as proving the value of the cure. If, however, we remember, that principally the patients there congregated, are suffering from gout, rheumatism, hypochondria, scrofula, and especially syphilis,—diseases, therefore, under which the body is by no means in an exhausted state, but, on the contrary, has an overplus of strength,—it is obvious, that this enormous appetite is not a symptom of convalescence, but the result of extraordinary exercise and of the fresh and sharpening air of the mountains.

After dinner, which, during the summer season, lasts two hours, the patients again resort to walks and water drinking. About four or five o'clock wet linen sheets, the head-baths, and sitting ditto, are again resorted to, and the wet rags renewed; after which they again move about, drink more water, until supper-time, finally replacing the wet rags with fresh ones before they go to bed.

Such is the usual method of cure. Some patients are, however, indulged in certain other peculiar methods of applying the liquid element, and practically learn the difference between douche, perspiring, whole, half-standing, as well as sitting, foot, and partial baths.

Such is life at Gräfenberg!—and thus Priessnitz performs his

cures!—And the results? They are not more favourable than in other watering-places. Half of the visitors are cured; the rest, to their great disappointment, discover, that neither washing nor rinsing with water, nor sudatoria or forced walks, nor even the crisis of Priessnitz itself, will expel the original disease; and they acknowledge, with dejected spirits, that the common method of cure, secures an alleviation of pain, in a less torturing and burdensome manner.

ULEX.

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ART. XVII.—*Creta precipitata.*

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*To the Editors of the Annals of Chymistry and Pharmacy.*

GENTLEMEN,—Will you allow me to call your attention, and, through your journal, that of druggists in general, to an article which has been offered and purchased by both wholesale and retail druggists (in one instance, I believe, to the extent of a ton weight), under the name of precipitated chalk, at 8d. or 10d. per lb. instead of 1s. 4d. or 1s. 6d. the price of the genuine article. Now I am not wishing to prevent individuals from purchasing as cheap as they can, but I do wish them to take heed as to what they purchase. This article appears beautifully white and flocculent, having all the appearance of the genuine, and no doubt used as such, without at all testing the article, thereby causing incalculable mischief; for it is nothing more than a *pure sulphate of lime*, which, if used in mixtures, I need not remind my brother druggists what mischief must ensue; and who would deserve the blame? Undoubtedly the dispenser. In the first place, for purchasing at a price which, *if genuine*, would be far below its worth; but, more than all, for not testing the article, either before or after he had purchased, which I hope will be done before using.

The person selling may not be aware of the evil, and no doubt gets an excellent profit; *that* may be all in all to *him*; but not so to the poor patient, for it may *deprive* him of all, even his life.

I remain, Gentlemen, your humble servant,

Chelsea, January 3, 1843.

W. BARTLETT.

[We feel indebted to the above communication of our correspondent, as furnishing the solution to a question which was referred to us under the following circumstances:—It is well known that the carbonic acid gas of the soda water manufacturer is obtained from whiting, and that it is disengaged therefrom by sulphuric acid. A short time since it was inquired of us to what purpose the pappy residuary mass of sulphate of lime and excess of whiting could be applied in chymistry. At the time we were unable to furnish a satisfactory reply: the impression of our querist being, that, on account of the secrecy observed in removing it, he had no doubt the uses to which it could be applied involved a good profit. We think Mr. B.'s letter may be received as a clue to the uses of this residue. *Creta precipitata* should be entirely soluble in acetic acid, with effervescence; the sulphate of lime, on the contrary, is insoluble.—ED.]

| NOMINA.                               | FORMULÆ.                                                 |
|---------------------------------------|----------------------------------------------------------|
| <i>Brometum</i> Subicum . . . . .     | Sb, Br <sub>2</sub> . . . . .<br>$\frac{1}{2}$ . . . . . |
| — Stronticum . . . . .                | Sr Br <sub>2</sub> . . . . .                             |
| — Telluricum . . . . .                | Te Br <sub>2</sub> . . . . .<br>$\frac{1}{2}$ . . . . .  |
| — Thoricum . . . . .                  | Th Br <sub>4</sub> . . . . .                             |
| — Uranicum . . . . .                  | U, Br <sub>2</sub> . . . . .<br>$\frac{1}{2}$ . . . . .  |
| — Uranosum . . . . .                  | U Br <sub>4</sub> . . . . .                              |
| — Vanadicum . . . . .                 | V Br <sub>2</sub> . . . . .<br>$\frac{1}{2}$ . . . . .   |
| — Wolframicum . . . . .               | W Br <sub>2</sub> . . . . .<br>$\frac{1}{2}$ . . . . .   |
| — Yttricum . . . . .                  | Y Br <sub>3</sub> . . . . .                              |
| — Zincicum . . . . .                  | Zn Br <sub>2</sub> . . . . .                             |
| — Zirconicum . . . . .                | Zr Br <sub>2</sub> . . . . .<br>$\frac{1}{2}$ . . . . .  |
| <i>Bromidum</i> Arsenicosum . . . . . | As, Br <sub>2</sub> . . . . .<br>$\frac{1}{2}$ . . . . . |
| — Boricum . . . . .                   | Br, Br <sub>2</sub> . . . . .                            |
| — Chromicum . . . . .                 | Cr Br <sub>2</sub> . . . . .                             |
| — Cynanicum . . . . .                 | Cy, Br <sub>2</sub> . . . . .                            |
| — Hydricum . . . . .                  | H, Br <sub>2</sub> . . . . .                             |
| — Hypophosphorosum . . . . .          | P, Br <sub>2</sub> . . . . .                             |
| — Jodicum . . . . .                   | J, Br <sub>2</sub> . . . . .                             |
| — Manganicum . . . . .                | Mn Br <sub>2</sub> . . . . .                             |
| — Molybdicum . . . . .                | Mo Br <sub>2</sub> . . . . .                             |

| PONDERA ATOMORUM. |                    | PARTES CENTESIMALES. |       |                      |
|-------------------|--------------------|----------------------|-------|----------------------|
| O = 100           | H <sub>+</sub> = 1 | + E                  | — E   | H vel H <sub>+</sub> |
| 4547,82           | 364,42             | 35,47                | 64,53 |                      |
| 1515,94           | 121,47             |                      |       |                      |
| 1525,29           | 122,25             | 35,87                | 64,13 |                      |
| 2758,38           | 221,03             | 29,07                | 70,93 |                      |
| 1379,19           | 110,52             |                      |       |                      |
| 1723,21           | 138,08             | 43,23                | 56,77 |                      |
| 8357,63           | 669,70             | 64,88                | 35,12 |                      |
| 2785,88           | 223,23             |                      |       |                      |
| 3689,66           | 295,66             | 73,49                | 26,51 |                      |
| 2813,50           | 225,45             | 30,46                | 69,54 |                      |
| 1406,75           | 112,72             |                      |       |                      |
| 3139,61           | 251,58             | 37,68                | 62,32 |                      |
| 1569,81           | 125,79             |                      |       |                      |
| 1380,82           | 110,63             | 29,15                | 70,85 |                      |
| 1381,53           | 110,70             | 29,19                | 70,81 |                      |
| 3775,32           | 302,52             | 22,26                | 77,74 |                      |
| 1258,44           | 100,84             |                      |       |                      |
| 3875,00           | 310,51             | 24,26                | 75,74 |                      |
| 1291,67           | 103,50             |                      |       |                      |
| 6142,25           | 492,18             | 4,44                 | 95,56 |                      |
| 3286,73           | 263,37             | 10,70                | 89,30 |                      |
| 1308,22           | 104,83             | 25,22                | 74,78 |                      |
| 990,79            | 79,39              | 1,26                 | 98,74 |                      |
| 1370,59           | 109,83             | 28,62                | 71,38 |                      |
| 6471,03           | 518,53             | 24,41                | 75,59 |                      |
| 3280,81           | 262,89             | 10,54                | 89,46 |                      |
| 3533,44           | 283,13             | 16,94                | 83,06 |                      |



| NOMINA.                                      | FORMULÆ.                               |
|----------------------------------------------|----------------------------------------|
| <i>Bromidum</i> Nitrosum . . . . .           | $N_3 Br_2$ . . . . .                   |
| — Phosphoricum . . . . .                     | $P_3 Br_2$ . . . . .                   |
| — Phosphorosum . . . . .                     | $P_3 Br_2$ . . . . .                   |
| — Selenosum . . . . .                        | $Se Br_2$ . . . . .                    |
| — Selenicum . . . . .                        | $Se Br_2$ . . . . .                    |
| — Silicium . . . . .                         | $Si Br_2$ . . . . .                    |
| — Stibicum . . . . .                         | $Sb_3 Br_2$ . . . . .                  |
| — Stibiosum . . . . .                        | $Sb_3 Br_2$ . . . . .                  |
| — Tantalicum . . . . .                       | $Ta_3 Br_2$ . . . . .                  |
| — Titanicum . . . . .                        | $Ti Br_2$ . . . . .                    |
| — Wolframicum . . . . .                      | $W Br_2$ . . . . .                     |
| <i>Cadmium</i> . . . . .                     | $Cd$ . . . . .                         |
| <i>Calcium</i> . . . . .                     | $Ca$ . . . . .                         |
| <i>Calx</i> . . . . .                        | $\dot{Ca}$ . . . . .                   |
| <i>Carbonas</i> Ammoniaci . . . . .          | $N_3 H_3 \ddot{C}$ . . . . .           |
| — Ammonicus . . . . .                        | $N_3 H_3 \ddot{C}$ . . . . .           |
| <i>sesqui Carbonas</i> Ammonicus . . . . .   | $2 N_3 H_3 + \ddot{C}^3$ . . . . .     |
|                                              | $\frac{1}{2}$ . . . . .                |
| <i>bi Carbonas</i> Ammonicus cum aq. . . . . | $N_3 H_3 \ddot{C}^3 + 2 H_2$ . . . . . |
| — Argenticus . . . . .                       | $\dot{Ag} \ddot{C}$ . . . . .          |
| — Baryticus . . . . .                        | $\dot{Ba} \ddot{C}$ . . . . .          |
| <i>sesqui Carbonas</i> Baryticus . . . . .   | $\dot{Ba}^3 \ddot{C}^3$ . . . . .      |
| <i>bi Carbonas</i> Baryticus . . . . .       | $\dot{Ba} \ddot{C}^3$ . . . . .        |
|                                              | $\frac{1}{2}$ . . . . .                |
| <i>Carbonas</i> Bismuthicus . . . . .        | $\dot{Bi} \ddot{C}$ . . . . .          |
| — Cadmicus . . . . .                         | $\dot{Cd} \ddot{C}$ . . . . .          |
| — Calcicus . . . . .                         | $\dot{Ca} \ddot{C}$ . . . . .          |

| PONDERA ATOMORUM. |                    | PARTES CENTESIMALES. |       |                      |
|-------------------|--------------------|----------------------|-------|----------------------|
| O = 100           | H <sub>2</sub> = 1 | + E                  | — E   | H vel H <sub>2</sub> |
| 3111,93           | 249,36             | 5,69                 | 94,31 |                      |
| 5283,82           | 423,40             | 7,42                 | 92,58 |                      |
| 3327,20           | 267,23             | 11,79                | 88,21 |                      |
| 2451,20           | 196,42             | 20,18                | 79,82 |                      |
| 3429,50           | 274,81             | 14,42                | 85,58 |                      |
| 3212,23           | 257,40             | 8,63                 | 91,37 |                      |
| 6504,43           | 521,21             | 24,80                | 75,20 |                      |
| 5526,13           | 442,81             | 29,19                | 70,81 |                      |
| 5242,35           | 420,07             | 44,01                | 55,99 |                      |
| 2260,27           | 181,54             | 13,43                | 86,57 |                      |
| 4117,92           | 329,97             | 28,73                | 71,27 |                      |
| 696,77            | 55,83              |                      |       |                      |
| 256,02            | 20,52              |                      |       |                      |
| 356,02            | 28,53              | 71,91                | 28,09 |                      |
| 490,91            | 39,34              | 43,69                | 56,31 |                      |
| 603,89            | 48,35              | 54,19                | 45,81 |                      |
| 1483,22           | 118,86             | 44,09                | 55,91 |                      |
| 494,41            | 39,62              |                      |       |                      |
| 1104,79           | 88,53              | 29,60                | 50,04 | 20,36                |
| 1728,05           | 138,42             | 84,00                | 16,00 |                      |
| 1233,32           | 98,83              | 77,59                | 22,41 |                      |
| 2743,07           | 219,81             | 69,77                | 30,23 |                      |
| 1509,76           | 120,98             | 63,38                | 36,62 |                      |
| 754,88            | 60,49              |                      |       |                      |
| 1263,36           | 101,23             | 78,12                | 21,88 |                      |
| 1073,21           | 86,00              | 74,24                | 25,76 |                      |
| 632,46            | 50,68              | 56,29                | 43,71 |                      |

ART. XVIII.—*Iodide of Sulphur*

Is prepared by fusing both elements with each other. It forms an iron-grey, glittering, crystalline mass, consisting of 80 iodine, and 20 sulphur. Water deprives it of a portion of its iodine; spirit of wine decomposes it completely, the iodine being dissolved in it, and the sulphur remaining behind. It is also easily separable into its elements by heat, and is usually a weak combination. It possesses the odour of iodine, and produces a similar stain when applied to the skin. Iodide of sulphur has been recently recommended in the form of ointment (one part of iodide of sulphur to sixteen or twenty of lard) against chronic eruptions of the skin. Vegol speaks highly of it, especially in that species of *Psoriasis* which follows itch, and covers the whole body with greasy scales without reddening the skin.—*A. Duflos' Ph. Chem.*

## POISONING BY CYANIDE OF POTASSIUM.

IN an article inserted in No. 13 of the ANNALS, under the title of "A Case for Chymists," will be found the particulars of a case of poisoning with cyanide of potassium. M. Macé, a physician, had prescribed the cyanide of mercury in doses of five grains each; but on the remonstrance of the dispensing chymist, M. Fiel (and our experience informs us that such hints from the druggist are not rare), iodide of potassium was substituted for the cyanide of mercury; and well it was so. However, M. Macé still, intent on his remedy, and doubtless having gathered a few vague suggestions in reference to cyanogen from the theoretical views of Liebig, the prostitution in lieu of verification of whose views appears to be no less the fashionable species of quackery in France than it most indubitably is in England—M. Macé, we repeat, resolved upon the exhibition of the cyanide of mercury; no, the *cyanide of potassium, because he deemed it a milder preparation!* God help the worthy inhabitants of St. Malo. Less injury would arrive in their town from a bombardment *à la Barcelone* than from such a physician being admitted into the chambers of their sick. The cyanide of potassium was, however, administered to the extent of *fourteen grains* within a fraction of a grain, equivalent to four drachms of the prussic acid of the London Pharmacopœia, whose dose is stated to be only from *one to two drops*. The physicians examined by the court stated that cyanide of mercury was a much less violent poison than iodide of potassium. We wish them joy of their discovery, and recommend them to try the experiment on themselves, selecting a time when they possess a good appetite: under these circumstances the gastric juice may fairly be supposed, as well charged with hydrochloric acid. We engage they will not live a quarter of an hour longer than the victim of involuntary homicide, caused by the singular (we hope) ignorance of a few details of chymistry on the part of M. Macé.

To afford the student a comparative idea of the action of these remedies, we need only state that

Cyanide of potassium contains, in round numbers, 40 per cent. of cyanogen.

|                        |         |           |    |   |
|------------------------|---------|-----------|----|---|
| "                      | mercury | "         | 20 | " |
| "                      | silver  | "         | 20 | " |
| Hydrocyanic acid, P.L. | "       | less than | 2  | " |

Whilst a few drops of muriatic acid, which is almost always free in the stomach, would release the whole of the cyanogen in the poisonous form of hydrocyanic or prussic acid! the moment it is brought in contact with these salts, at the temperature of the stomach. Iodide of potassium (pure) may be given with impunity in doses of twenty grains. Instances of forty grains have come under our notice; but in these cases we are inclined to believe the manufacture of this salt had not reached its present state of perfection.

\* \* \* *Communications, Books for Review, &c. are requested to be addressed*  
—"To the Editors of the ANNALS OF CHYMISTRY, care of Messrs. Longman, Brown, and Co. Paternoster Row."

WILSON AND OGILVY, 57, SKINNER STREET, SNOWHILL, LONDON.

THE  
ANNALS OF CHYMISTRY  
AND  
PRACTICAL PHARMACY.

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CHYMICAL SYMBOLS.

*Enter some bringing in the Clerk of Chatham.*

*Smith.* The Clerk of Chatham : he can write and read, and cast accompts.

*Cade.* O ! monstrous.

*Smith.* We took him setting of boys' copies.

*Cade.* Here's a villain !

*Smith.* H'as a book in his pocket, and red letters in 't.      \* \* \* \*

*Cade.* \* \* \* Dost thou use to write thy name ? or hast thou a mark to thyself, like an honest plain-dealing man ?

*Clerk.* Sir, I thank God, I have been so well brought up, that I can write my name.      \* \* \*.

*Cade.* Away with him, I say : hang him, with his pen and ink-horn about his neck\*.

ETERNAL change is one of the great laws of nature ; mountains are made level and valleys filled up by the mere flow of time ; volcanoes burn out, islands rise and disappear, vast forests are changed into beds of coal. Human institutions are still more fugacious. Empires disappear politically, more frequently than islands do physically ; and the progress of society often deprives laws of all utility and meaning, and makes them not only obsolete, but ridiculous.

It is just the same in science. Theories once plausible, and manuals once indispensable, give way to better books, and more ingenious hypotheses ; and it would argue a strange fatuity to prefer BAUHIN to DE CANDOLLE, or BOYLE to LIEBIG.

As long, indeed, as the change is of doubtful advantage, the prudent may be excused for hesitating ; but where the alteration is obviously required, and universally adopted, the reluctance of the over-cautious is but another name for blindness.

“ Antiquity,” says “ BACON,” deserveth that reverence, that men should make a stand thereupon, and discover what is the

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\* Second Part of Henry VI. Act. iv. Scene 2.

best way ; but when the discovery is well taken, then to make progression\*."

Yet we fear that this palpable truth will not be immediately admitted by the whole of our profession. Some will shrink from accepting an axiom which must add to their labours ; and they will exclaim, that if the new chymical nomenclature is a heavy burden to their memories, the doctrine of chymical symbols is a crushing one. They will consider the great analysts of our day as decided *miso-chymists*, and will be inclined to address BERZELIUS after the fashion in which JACK CADE reviles the Lord SAY :—

"Thou hast most traitorously corrupted the youth of the realm, in erecting a grammar-school : and, whereas, before, our forefathers had no other books but the score and the tally, thou hast caused printing to be used ; and contrary to the king, his crown, and dignity, thou hast built a paper-mill. It will be proved to thy face, that thou hast men about thee, that usually talk of a noun, and a verb ; and such abominable words, as no Christian ear can endure to heart†."

Yet we are persuaded that few could cast an impartial glance on this subject, without being convinced that chymical symbols are the most admirable notation that could have been devised for expressing chymical combination. This notation, indeed, may be termed the orthography of chymistry ; and we might expect the tyro who had learned his alphabet, but had not yet entered upon the elements of the science, to master its spelling-book in our pages.

It is acknowledged by the general assent of the two higher branches of the medical profession, that the druggist's shop is the repository of the best and purest remedies. This is obviously the fact ; and it behoves him to maintain his vantage ground by diligence and study ; but could we conceive the humiliating possibility of a chymist's shop worse ordered than an apothecary's, we should blush for our fallen brother, and should recommend him a double portion of diligence and study to retrieve his caste.

It is required of all who have any pretensions, we will not say to learning, but to a decent knowledge of a language, that they should be able not only to pronounce its words, but give an account of the letters which compose them. And with the whole of his

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\* On the Advancement of Learning.

† Second Part of Henry VI. Act iv. Scene 7.

time devoted to the preparation and consequent examination of drugs, it cannot be deemed too much to ask that the chymist should be able to *spell* the remedies which he compounds.

To show the simplicity of chymical symbols, we will just give a sketch of those used by Berzelius.

It is well known that certain elementary bodies combine in proportions which are invariable. Thus *potassa* is composed of *oxygen* and the elementary metal *potassium*. Now, whenever we procure potassa, its component parts are inevitably and invariably in the proportion of eight grains, by weight, of oxygen, to 39·2 grains of potassium, which will make up 47·2, the equivalent of potassa.

Again, the symbol for potassa is K; let us analyse or spell it.

K is K with a dot;

K represents Kalium or Potassium;

the dot stands for Oxygen;

therefore K with a dot, or  $\dot{K}$ , stands for Kalium or Potassium combined with Oxygen; that is, for Kali\* or Potassa.

Or, we may represent the above facts by a diagram, thus:

|           |   |   |   |   |           |         |
|-----------|---|---|---|---|-----------|---------|
| $\dot{K}$ | : | : | : | : | Oxygen    | 8       |
|           | : | : | : | : | Potassium | 39·2    |
|           |   |   |   |   |           | 47·2    |
|           |   |   |   |   |           | Potassa |

And if we multiply this quantity of potassa by 10, and suppose the product 472 to be pounds, or ounces, it will contain 80 pounds, or ounces, of oxygen; and so for any quantity, large or small. Surely this is simple. We hope that we shall hear no more of chymists shrinking from an imaginary difficulty like this. Let him rather be the morbid exception, who, while blazoning the title of CHYMIST over his door, is disheartened by the spelling-book of the language he ought to read, and cannot master the elements of the science which he professes.

## CHYMISTRY, OPERATIVE AND EXPERIMENTAL.

### ART. II.—On Crystallization.

[Continued from page 435.]

THE phenomenon of decrepitation usually occurs in crystals obtained from aqueous solutions of salts, which do not contain

\* Kali, as most of our readers know, is one of the old names for carbonate of potassa; and *Kali purum* for potassa.

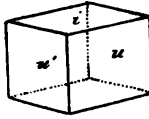
any water chymically combined; also some salts admitting small quantities of combined water, as bicarbonate of potassa, tartar, emetic tartar, and simple binacetate of copper, are subject to slight decrepitation, arising from the mother-liquor inclosed in them. The fact that chloride of sodium, crystallized by artificial means from its aqueous solution, decrepitates, but not when formed by nature (rock-salt, mineral salt), leads to the inference that the latter may have been crystallized, after fusion by heat. There is only one kind of rock-salt which decrepitates by heating, the decrepitating salt of WIELIBSKA, arising, however, not from the water it contains inclosed, but hydrogen, and other inflammable gases, in a highly condensed state. Similar phenomena are observed in many minerals crystallized in veins, as cauk (ponderous spar), calcareous spar, fluor, sparry iron ore, red-lead ore, potter's ore (lead glance), pyrites (sulphuret of iron), inferior copper ores, gray copper ore, containing silver, &c., which sometimes decrepitate, and sometimes not; in the former case they do not evolve any water, but probably a gas, which may have been inclosed between their laminæ in a highly compressed, and, perhaps, fluid state (H. ROSE, *Pogg.* 48, 354).

If any solution contains other less easily crystallizing substances, besides the crystallizing body, a mother-liquor remains after the greater part of the former has assumed the crystalline form, and which contain the latter substances also. On this property is founded an easy mode of purifying substances which crystallize readily, by repeatedly dissolving and re-crystallizing them, decanting the mother-liquor, washing with small quantities of the dissolving liquid, without the application of heat, and pressing them between blotting paper. For the purpose of purification, the preference is generally given to large crystals, which have been obtained by undisturbed and slow refrigeration or evaporation, because these crystals have less surface in proportion, and may be easier freed, by washing, from the adhering mother-liquor. By the modern French method of purifying saltpetre, on the contrary, crystals as small as possible are produced by continual stirring, and quick refrigeration of the hot solution, because the large crystals are likely to inclose a greater quantity of the mother-liquor, which cannot be removed by washing. Considering, however, that it is precisely during the process of that crystallization, which proceeds slowly, that the smallest quantity of mother-liquor is inclosed, and that it is much more difficult, on the other hand, to free the small crystals from mother-liquor adhering to their surface, the preference must be awarded to the slow method of producing crystals, recommended by CLEMENT and DESORMES (*Ann. Chim.* 92, 248), notwithstanding the objections of LONGCHAMP (*Ann. Chim. Phys.* 9, 203). Systematic purification by crystalliz-

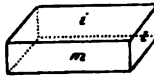




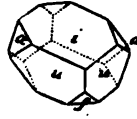
*Fig 81*



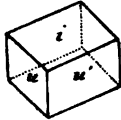
*Fig 82*



*Fig 83*



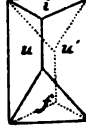
*Fig 91*



*Fig 92*



*Fig 93*



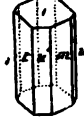
*Fig 101*



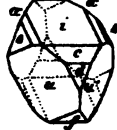
*Fig 102*



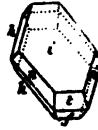
*Fig 103*



*Fig 111*



*Fig 112*



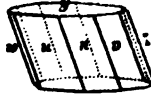
*Fig 113*



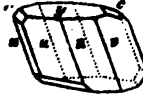
*Fig 121*



*Fig 122*



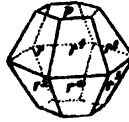
*Fig 123*



*Fig 131*



*Fig 132*



*Fig 133*



*Fig 141*



*Fig 142*



*Fig 143*



*Fig 151*



*Fig 152*



*Fig 153*



ing, *e. g.* saltpetre, is executed in the following manner:—1stly, The saltpetre is heated with water, in a vessel *a*, until dissolved, then crystallized by refrigeration; the mother-liquor then, as completely as possible, decanted, by inclining the vessel *a*, for some time, into a vessel *b*; the crystals are then repeatedly washed with a small quantity of cold water, which is likewise decanted, as completely as possible, after each ablution, into the vessel *b*. 2dly. The contents of *a* are heated with water until solution is effected, and those of *b* until two-thirds of the liquor are evaporated; after crystals have formed in *b*, the remaining mother-liquor is decanted into a third vessel *c*; the crystals in *b* are then repeatedly washed as stated, when the mother-liquor and the washings of the crystals in *a* are poured over those in *b*. 3dly. The three vessels are exposed to heat until the crystals in *a* are dissolved in fresh water, those in *b* in the mother-liquor and the washings from *a*, and until the liquor in *c* is sufficiently condensed by evaporation. The operation is continued in this manner, with the addition of more and smaller vessels, until, finally, the saltpetre in *a*, then that in *b*, and so on, appears perfectly pure; in the last vessel almost all the impurities of the saltpetre are found collected, the preceding ones containing small quantities of a proportionately less impure salt.

5. Any formation of crystals whatever is connected with the evolution of heat, which is especially apparent during rapidly-ensuing crystallization; chiefly, therefore, in the above-described anomalous case, when a cooled liquor suddenly assumes the crystalline form. In some few cases of crystallization, an evolution of light may be perceived.

#### EXTERNAL FORM OF CRYSTALS.

There are more than one thousand different forms of crystals. According to their linear dimensions on axes, they may be comprised in a few groups; and, according to WEISS (*Abh. d. Phgs. Classe der Th. Academie d. Wiss. zu Berlin*, 1814 u. 1815, S. 298), reduced to the following systems:—

A. The proportion of the parts may be defined by their linear dimension, or in a direction perpendicular to each other.

*a.* The three dimensions are equal—*regular, spheroidical, tessular system* of crystals.

*α.* The whole of the analogous surfaces are found on the crystal at each extremity of the axes corresponding in four directions in an equal proportion of their surfaces:—*Homospheroidical* system, comprising the *regular Octohedron*, the *Rhomboïdo decahedron*, the *Trapezoid*, the *Pyramidocube*, *Pyrami-octohedron*, the *Pyramido-decahedron*, &c. (diamond, say ammoniac, common salt, sulphate of zinc, most of the simple metals, &c. Fig. 1, 12).

*β.* One half of the analogous surfaces have been dislodged

by the other at the extremities of each axis, an equal proportion of the surfaces corresponding only in two opposite directions. *Hemispheroidal system.* This comprises, on the one hand, the *regular Tetrahedron*, together with its modifications, formed by the disappearing of four faces of the regular octohedron (grey copper ore containing silver, Boracite, fig. 13 to 17); on the other hand, the *Pentago-decahedron* with its modifications produced by the disappearing of twelve surfaces of a Pyramidocube (Pyrites (sulphuret of iron) fig. 18 to 20).

b. Two axes only are equal—*Fourmembered, two and one axial*, or *quadratic system*, containing especially the *acute and obtuse Quadra-octohedron*, the *quadratic* and the *regular eight-sided column* (yellow lead ore, Zircon, calomel, ferro-cyanide of potassium, tinstone, &c. fig. 21 to 40).

c. All the three axes are unequal.

a. All the analogous surfaces appear; the main form to which the others can easily be reduced is that of a rhombo-octohedron. *Two and two membered*, or *one and one axial system*, comprising the *rhombic Octohedron* (fig. 41), the *Rectangular Octohedron* (fig. 47) 2 *Ditetrahedra* (one of them fig. 54), the *straight rhombic*, fig. 44), and the *retangular column*, and many more complicated forms (sulphur, saltpetre, sulphate of lead, cauk (ponderous spar), sulphate of magnesia, &c. fig. 41 to 80).

β. One point of the analogous surfaces is dislodged; in fig. 54 the fore under surface and the back upper surface *y*; the main crystal form is a rhombic column, with the surfaces added obliquely at the extremity; thus, one diagonal line of the surfaces at the extremities stands perpendicular on two sides (or edges); the other diagonal line obliquely on the two other linear sides (or edges). Sometimes the base is obliquely inclined to the obtuse linear sides (fig. 81), sometimes to the acute edges (fig. 91). This system comprises likewise the oblique rectangular column (fig. 82 and 92). *Two and one membered system* (Augite, borax, gypsum, phosphate of ammonia, sulphate of iron, &c. (fig. 88 to 189). A modification of this system is the *one and two membered system*.

γ. Here it is necessary to introduce the system discovered by Mitscherlich (*Pogg.* 8,427) in hyposulphite of lime and in the nitrate of quicksilver, the main form of which is a rhombic column, in which the faces *u* and *u'* are of equal value, but with a base obliquely added to all the linear sides, formed as if the face *a* (fig. 99) had dislodged the faces *i* and *u* (fig. 120).

δ. By dislodging two parallel *y*-faces and two parallel *u*-faces (fig. 54) at the same time, and replacing the latter by two new faces *v*, a rhomboic column is formed; the terminating faces are added obliquely, so that their two diagonal lines form oblique angles with the linear sides of the column: every two

parallel faces only, and every two diagonally opposed edges and angles, being of the same value. *One and one mentioned system* (sulphate of copper, boracic acid, gallic acid, &c. fig. 121 to 130).

B. The proportion, if the different parts of crystals may be defined, by supposing four linear dimensions, three of which being equal to each other in the same plane, and forming an angle of  $60^\circ$  with each other, are perpendicularly placed to a fourth.

*Three and axial system.*

a. All the analogous faces are present; at each extremity of the six axes above and beneath, the same proportion of the faces may be observed. *Sixmembered system*, comprising the *double-sided pyramid*, the *six-sided* and *twelvesided column*, &c. (Apatite, &c. fig. 131 to 140).

b. Of every two parallel and analogous faces one is not shown. At both ends of the side axes, the position of the upper face or faces appears different from the under ones. *Three and three-membered system*. Its main form is the rhombohedron, the formation of which may be supposed as formed from the double six-sided pyramid by the alternate disappearance of half the faces (calcareous spar, cinnabar, oxide of iron, protoxide of chromium, &c. fig. 141 to 160\*).

| Weiss.                                   | Mohs.                                                                 | Naumann.                                        | Breithaupt.                                                        | Hausmann.       |
|------------------------------------------|-----------------------------------------------------------------------|-------------------------------------------------|--------------------------------------------------------------------|-----------------|
| Regular 4 membered,<br>or 2 and 1 axial. | Tessular.                                                             | Tesseral.                                       | Tessular.                                                          | Isometrical.    |
| Two and 2 membered,<br>or 1 and 1 axial. | Pyramidal.                                                            | Tetragonal.                                     | Tetragonal.                                                        | Monodimetrical. |
| Two and 1 membered,<br>One and 1 axial.  | prismatic.<br>{ Orthotypical.<br>Hemiorthotypical.<br>Anorthotypical. | Rhombic.<br>Mono-clinoedric.<br>Tri-clinoedric. | Holoedricorhombic.<br>Hemiedricorhombic.<br>Tetartoeedricorhombic. | Trimetrical.    |
| Mitscherlich's System.                   | Hemimanorthotypical.                                                  | Diclinoeedric.                                  |                                                                    |                 |

The chief forms of these systems are frequently further varied by different faces, rendering the original ones obtuse, sharp, pointed, or dividing and rounding them.

The same substance is capable of crystallising in various forms, which, however, appertain, in most cases, to the same system of crystallography, and which agree with each other with respect to their angles, and may be reduced to a common fundamental form. Thus, in calcareous spar, several hundreds of different crystalline forms are met with, which appertain, however, altogether to the three and three membered system, and the fundamental form of which is considered as an obtuse rhombo-

\* Nomenclature of the system of crystallography by different writers.

hedron (fig. 141). Although one crystalline form of a certain substance may be known, it may, nevertheless, be inferred, that under certain circumstances it is able to assume other forms likewise, which appertain to the same system of crystallography. The reason why the same substance assumes sometimes this and sometimes another form of the same system, has, however, hitherto not been sufficiently ascertained. According to BEUDANT (*Ann. Chim. Phys.* 8, 5), the temperature, electrical state, concentration and volume of the liquor, the shape and substance of the vessels, the pressure of the barometer, and position of hygrometer, exert no influence thereon. BOUCHARDAT (*Ann. Chim. Phys.* 52, 296), obtained likewise common salt, always in cubes, alum in octahedrons. If it were not that they were of a different size, the crystallization might have been carried on in vessels of sulphur, graphite, or any of the different metals. The presence of foreign substances in the crystallizing liquor always exerted the greatest influence. Sal ammoniac, which forms in octahedra, from a solution in pure water, furnishes cubes, when a considerable quantity of urea is present. When only a little either urea or boracic acid is present, it then forms cubic-octahedra. Common salt, crystallizing in cubes, when by itself, assumes, if the solution contains, at the same time, urea, an octahedric—if it contains boracic acid, a cubo-octahedric form. Chloride of potassium, forming cubes by itself, yields, in presence of quicksilver, cubes with obtuse edges (fig. 5). A solution mixed with a little alkali does not form into octahedra, but into cubes—if mixed with muriatic acid, cubo-icosahedra (fig. 20), and if mixed with borax, cubo-octo-dodecahedra (fig. 8). Sulphate of iron, when alone, takes the form of fig. 111; by mixing the solution with sulphate of zinc and a salt of magnesia, according to BEUDANT, it furnishes crystals which have only the faces i, u, and c. By the presence of sulphate of copper, the face c disappears also, in the presence of muriatic acid, borax, or phosphate of soda. On the other hand, the crystals are provided with still more faces than represented in fig. 111. According to BEUDANT, either a solution of alum or sulphate of iron, mixed with a pulverised sulphate of lead, deposits in the sediment crystals more simply formed, and provided with fewer and less bright faces than when alone. This phenomenon can, however, scarcely, as BEUDANT infers, arise from the mechanical influence of the powder, but rather from the chymical action of the sulphate of lead, of which a very slight quantity is dissolved. The above-mentioned cases respecting fluor prove that at certain times foreign substances were present during its crystallization. In some cases only, as in those of sulphate of iron, being mixed with sulphate of zinc and copper, it is proved that the foreign substance passes simultaneously into

the crystals. In most cases, however, *e. g.* in that of common salt, mixed with urea, this phenomenon seems not to occur, and the action of such matters may, in general, be accounted for by this reason, that their presence causes the molecules of the liquor, from which the body assumes its crystalline form, to combine according to certain fixed laws.

There are, however, several exceptions to the rule that all crystalline forms of the same substance appertain to the same crystalline system, and may be derived from one and the same fundamental form. Some simple and compound substances are *dimorphous*, and, perhaps, even *trimorphous*; that is to say, they yield, according to circumstances, perhaps, even three different groups of crystalline forms, which may be traced to two or three different systems, or, at least, different fundamental forms.

As there are only a few crystalline systems, and, on the other hand, several thousands of crystallizable substances, the same system, of course, comprises very many substances differing very much from each other; and certain distinct forms of the same system recur in very heterogeneous substances. If the forms of different substances appertain to the regular crystalline system, no difference in the angles can occur, because, the three axes being equal, the angles of the regular octahedron are always the same. It may consist of alum, sal ammoniac, or diamond. Since, however, in the other systems, an inequality of the axes occurs, and as this inequality differs in different substances, a greater or lesser difference in the angles of the crystal appertaining to different substances is thereby admitted. Thus the quadratic octahedron of the Anatas (fig. 21) is pointed; and that of Zirconium (fig. 23) obtuse; because, in the former, the main axis is longer; in the latter, shorter than the two side axes. This difference of the angles is, however, frequently but very slight. Thus the obtuse edge of the rhombic column of the salt of magnesia (sulphate of magnesia) (u. u' fig. 71) has  $90^{\circ} 30'$ ; that of the sulphate of zinc (u. u' fig. 73)  $91^{\circ} 7'$ ; and the angle of the summit-edges of the obtuse rhombohedron (r. r') amounts, in calcareous spar, to  $105^{\circ} 5'$ ; in manganese spar, to  $106^{\circ} 57'$ ; in iron spar, to  $107^{\circ} 2'$ ; in rhombic spar, to  $107^{\circ} 22'$ ; and, in zinc spar, to  $107^{\circ} 40'$ . The similarity of angles is, however, frequently connected with a similarity of composition in the chymical compound.

#### INTERNAL CONSTRUCTION OR TEXTURE OF CRYSTALS.

Almost all crystals are more easily separable in certain directions, forming straight planes, than in others; they form from one to seven laminæ, intersecting each other at certain fixed angles. This difference in the division of a crystalline mass not only becomes evident when submitted to mechanical action, but, ac-

cording to DANIELL, (*Schw.* 19, 38; and 194), also during chymical action, so far as externally amorphous masses of different bodies of crystalline construction, placed in a dissolving liquid, which does not act too rapidly thereon, indicate from the pieces not being entirely dissolved; certain furrows and depressions may be observed in the direction of their laminæ, and these pieces assume pretty distinctly one of the fundamental forms of that crystalline system to which the substance belongs. Likewise, if pieces of grey antimony ore are placed in sulphuret of antimony, previously in a state of fusion, and are then partially fused, the nonfused part appears in separate crystals—FARADAY (*Schw.* 82, 481). This property may also be taken into account for the WIDMANNSTADTEN's figures, and the *Moiré métallique* or crystallized tin; that is to say, designs corresponding to the arrangement of the laminæ, and which appear when acids are allowed to act on meteoric iron or tin plate. The more distinct laminar forms correspond usually with the faces of one or the other fundamental form of that crystalline system to which it appertains; the less distinct to the less important face of the same system. Thus, fluor shews four laminæ, corresponding to the eight faces of the regular cohedron, or to the four faces of the regular tetrahedron; the three laminæ of cauk (ponderous spar), (Fig. 40), are parallel with the faces *p*, *u*, and *v* of the straight rhombic column; the three of calcareous spar, with the six *r*-faces of the obtuse rhombohedron (Fig. 141), &c. In several crystals of the same substance, one or the other less distinct laminæ is frequently wanting; those, however, which appear, always form exactly the same angle with each other, whatever the external form may be. Different substances may exhibit the same laminæ in case they appertain to the regular system; if this, however, is not the case, they exhibit, although not frequently, slight differences in the direction of their laminæ. A crystal which we represent split, according to its more distinct or all its laminæ, is divided in its simple component parts, or, as they are termed, *molecules integrantes*, the form of which is a regular or irregular tetrahedron, a regular or irregular three-sided column, or a parallelopipedon. If the faces of a crystal are not parallel to its chief laminæ (*secondary crystalline form*), an external case, the *secondary mass*, as it is termed, may be separated by splitting the crystal on certain points, in the direction of its chief laminæ, from the *central crystal*, the *nucleus*, the faces of which correspond to the most essential laminæ. This form is considered by HAUY (*Traité de Minéralogie*, t. i.) as the *primary form*, as if formed at first; on the faces of which lamellæ are then deposited, either consisting of simple molecules, or of combinations of them, forming compound molecules (*molecules soustractives*), and which, according to certain laws regulating the decrease of the lamellæ, beginning from the edges or

corners, thus produce the secondary form. This is, however, merely a theoretic expression, employed by HAUY for the purpose of calculating the secondary faces, since it appears that the crystals show the same form at their origin as after their complete formation. The angles of the different primary and secondary forms of a crystal, also, according to Weiss, may be calculated from the mere proportion of its linear dimensions, unassisted by such an hypothesis, which, indeed, is contrary to the nature of things. By the atomic theory, it has been attempted to derive the construction of the crystals from a certain form either of the atoms themselves, or, if imagined as spheres, of several of them united together. The followers of the dynamic theory partly start from the idea, that solid bodies differ from those which are liquid, from the property of cohesion of their molecules being different in different directions; and, further, that, in a crystal, those directions extend through the whole mass in straight and polar lines.—L. GMELIN, *Handb. d. Chem.* 1 Bd. 1 S. p. 9. ff.

ART. III.—*Elementary Course of Pharmacy, chiefly from the German of P. A. Cap and Rudolph Brandes, collated with the Works of Phæbus, Soubeiran, Guibourt, Lecanu, Duflos, Gmelin, &c. &c.*

[Continued from page 474.]

#### THE PERIOD OF APPRENTICESHIP.

##### *First Epoch.*—CHAPTER I.

##### INTRODUCTION TO BUSINESS—GENERAL HISTORY—NOMENCLATURE AND CLASSIFICATION OF REMEDIES.

Wer die Pflichten, die uns die geläuterten Religions principien oder die allgemeine Moral lehrt, kennt, dem ist es auch leicht, sie auf den Apotheker überhaupt und den Lernenden insbesondere zu beziehen\*.—*Bucholz.*

Ce n'est pas en lisant qu'on apprend la Chimie et la Pharmacie; c'est en voyant opérer et en opérant soi-même, en familiarisant ses yeux et ses mains avec les objets des opérations, et avec des instruments dont on y fait usage.—*Cabani, Révolutions de la Médecine, 388.*

§ 31. To the young man who devotes himself to pharmacy all is new on his entrance into the business. The multiplicity of objects which suddenly surround him and occupy his mind oblige him to proceed at once to the task of learning their properties and laws in some certain order. During this period the first object is the practical study of a trade, whose ultimate aim is the application of the facts of physical and natural science. These sciences rest mainly on facts, the observation of which depends, first, on the senses, and afterwards on reasoning.

\* It is easy for him who is acquainted with the duties inculcated by the enlightened principles of religion or general morality, to apply them on a large scale as a master, and in detail as an apprentice.



§ 32. We have already remarked, that the commencement of instruction in pharmacy is not unfrequently attended with many disagreeables ; the tyro must, therefore, endeavour from the first moment of his apprenticeship to regard every thing that seems annoying, repulsive, or unpleasant, with the same desire to be master of it and the same feeling of duty as may be connected with the more agreeable parts of his profession. He must consider himself as a labourer in a work intended for the benefit of his fellow creatures, and in which even the slightest parts are of such description that their correct execution must do him credit ; and his greatest satisfaction should consist in the perfect and blameless execution of all the duties falling to his lot.

For instance, it is necessary that the labour of *cleansing* and *polishing*, which recurs every day, should be performed without any reluctance ; all the different manipulations shown to him having reference to the different vessels and tools, and the use of which should be acquired, must not only be performed properly, but also quickly, and without damaging the vessels or tools. He should, therefore, from the beginning, make himself acquainted with all the details here requisite, which he will soon and insensibly become accustomed to.

This is the more his duty, since he will afterwards be obliged to instruct and to overlook others in the same part of the business. Besides, these occupations furnish him this advantage, that he acquires the very necessary dexterity of manipulating with such tools and vessels, and thus becomes more and more acquainted with the uses of the latter, forming, it is true, at first, only an empirical, but, notwithstanding, an important foundation in connection with the preparation of remedies.

Cleanliness is the principal virtue which the young tyro has to acquire at first. It must become instinctive with him. Any offence against it must be held as insufferable. Arising from his delight in cleanliness, his taste will in part be thereby cultivated ; and that sense of order which alone inspires carefulness, precision, and neatness : in fine, he thus sows the seeds of good manners and good breeding, which should ever be paramount in the deportment of a chymist and druggist. There is a certain amount of custom which, perhaps, might be termed *pharmaceutical habits*, which the tyro, from the first beginning, should endeavour to acquire to their full extent. The most minute carefulness and close examination, if even it should appear childish—the execution and perfection even of the slightest objects which come under his hands, are not only characteristic of a good apprentice, but this endeavour afterwards aids as much as extensive instruction by others, in making him a skillful master and a practical man of superior attainments. “ *Optimum elige,*” says Bacon, “ *suave et facile illud faciet consuetudo.*”

§ 33. The first task of the pupil is to make himself acquainted with the different parts of the place of business, the name and use of the utensils, the furniture, and the different vessels of the shop, and to execute the light labours which he is ordered to do with precision and carefulness, in order to obtain therein a certain dexterity; as, for instance, in weighing or measuring, in capping, making paper bags, &c.

Respecting his conduct, as the last-arrived member of the house, he should behave to every one in an obliging manner, and endeavour to make himself useful. He should, under all circumstances, strictly observe the order or rules formed by the proprietor of the house where he lives, since every good household has always some fixed and convenient system, which must be kept up; and besides this, it would indicate great presumption to expect that this order should be altered according to the pleasure of the last comer; it is, on the contrary, his duty to accommodate himself cheerfully and willingly to the orders of the house, and to sustain it as much as he can; if otherwise, he will cause much pain, to avoid which is the duty of any young man who has been admitted member of a family.

§ 34. The apprentice should further direct his attention to all those sources of instruction which are open to him, and to observe all that is passing around him. He has to learn from the apprentice in the laboratory how to cleanse gathered plants, to dry, grind, and sift them, the cutting of roots, the chopping of herbs, to arrange the fire, to prepare the stove, to clean the apparatus and utensils; from the assistant in the shop, the value of the weights, the use of the balances, measures, and other implements, as well as the little details requisite in serving the public. Since the order, arrangement, and cleanliness of a shop is now one of the first of his duties, he should take advantage of these opportunities for examining any object coming under his hand, for comparing the inscription of the vessel with its contents, and to impress on his memory the exact position of every one of them in the shop. He must endeavour not only to see much, but to observe every thing from different sides and in different states. The same drug occurs frequently in different conditions—whole, cut, pulverised, by itself, and mixed with other bodies; he must, therefore, accustom himself to discover the characteristics by which he may be able to distinguish, easily and readily, such substance in its different forms. He has to retain a number of names of such objects in his memory, if even he combines with them only a few and imperfect conceptions. Gradually he will feel the desire of arranging all these objects in a proper order, and he then begins to occupy himself with *classification* and *nomenclature*.

§ 35. *Nomenclature* is the whole of the names of those objects

which are treated in any art or science. It is one of the first acquirements of any branch to ascertain its nomenclature.

A distinction is made between the *scientific* or *systematic* nomenclature, and the *retail* or *common* nomenclature. The latter is the denomination of the substances or objects in common life, or in ordinary transactions. For the apprentice, the scientific nomenclature is of the highest importance; not less, however, is that of common life. He has to remark the latter as well as the former, since the drugs and remedies are obtained from the chymist's shop by those names at the retail counter, the service of which forms part of his occupation; and he must direct his attention the more to this subject, as one and the same remedy has frequently a number of different trivial names, at times corrupted in the most singular way by mistake, and differing in various parts of the country. In such cases he must patiently and kindly listen to the customers, try to find out the objects sought by their descriptions, and if he does not succeed in this way, to refer to his superiors. He should never deliver any remedy if the slightest doubt is left on his mind whether it is the medicine sought, especially in cases of violently active drugs, else he would cause the greatest detriment, and, from a want of consideration, endanger the life of his fellow-creatures, together with the character of the business. To prevent such detriment is a sacred duty to the public, and to the concern in which he is placed, the good name of which it is obligatory on him to sustain by all just means in his power. He should never forget that the public has no other warranty respecting the purity of drugs than that order, precision, and carefulness, which appear in all the different parts of the business. The public measures its confidence by the degree of order which it observes throughout the concern, and it is obliged to trust a great deal to the chymist and druggist, who, on the other hand, should earnestly endeavour to justify this confidence in every respect. Every one who asks for any medicine in the shop, affords us a proof of their confidence, and we should appreciate and maintain this confidence by attentive and obliging conduct, and by a conscientious performance of the duties of our vocation.

[To be continued.]

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#### ART. IV.—*On the new metal, Didymum.*

At a meeting of the Scandinavian Philosophical Society, held at Stockholm, Mosander made some remarks on Cerium and Lanthanum. He first presented to the society a pale lemon-coloured oxide of cerium, described the general properties of the peroxide and protoxide of cerium, and then exhibited some of its salts. He then showed a colourless oxide of lanthanum,

which does not assume any colour even when heated to redness, and the salts of which are also colourless. He lastly declared, that the earth Yttrium, the oxides of cerium and lanthanum, are, in the mineral kingdom, accompanied by a twin-brother, the cause of the well-known roseate tint of their salts, and which metal can only be separated from them with difficulty, since it is acted upon by the same means of precipitation and solution as the three bases enumerated above.

This body is the oxide of a metal previously unknown, to which Mosander has given the name of Didymum (from *δίδυμος*, *twin*). This oxide is the cause of the brown colour of the impure oxide of cerium, and of the brick-red colour of the oxide of lanthanum. He then exhibited the dark brown oxide of didymum, and, for the sake of comparison, some crystallized salts of the oxides of cerium, lanthanum, and didymum. The two last are red. He observed, that he had not hitherto succeeded in discovering a method of perfectly separating these bodies, and that the fruitlessness of his attempts in this respect had delayed the present communication, which he had intended to have made some time ago; that he would not have mentioned, even now, a work which he felt obliged to declare was incomplete, if, as in the present case, he had not been impelled by certain circumstances. The preparations exhibited by him were not perfectly pure, but as pure as he had been able to obtain them up to the present time. They had been procured by crystallizing large quantities of the solutions concentrated by spontaneous evaporation; having previously purified every one of these oxides, so far as was practicable, by the application of such means as he was then cognisant of. He considered any attempt to fix its atomic weight as premature and useless, on account of its imperfect purity as at present obtained.—*Liebig's Ann.* Oct.

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ART. V.—*Analysis of Gunpowder.*

BOLLEY (*Schweizer Gewerbeblatt*, 1843, *Pol. Journ.* Bd. xcvi. 51) proposes a new method for analysing gunpowder, the value of which he affirms from his own experience. It is based on the property of sulphur to dissolve in sulphureous acid, forming thereby hyposulphites of salts. A sulphite of soda is previously prepared, by introducing sulphureous acid into a solution of carbonate of soda, until the carbonic acid is completely expelled. A certain quantity of dry gunpowder is then saturated with water; the residue then dried and weighed. This mixture is then brought into a solution of sulphite of soda (20 to 24 parts of sulphite of soda, and 1 part of the mixture of charcoal and sulphur), and boiled for one or two hours, replacing the water lost from evaporation and conducting the process in a retort

This is then filtered, the charcoal washed, and its weight ascertained: the portion dissolved therefrom is sulphur. The perfect separation of sulphur is ascertained by heating the residuary charcoal on a piece of platina foil.—*Journ. f. pr. Chimie*, Dec. 1842.

ART. VI.—*Chymical Analysis of the Lobelia inflata.*

By Dr. H. REINSCH.

THE components of *Lobelia inflata*, in 1000 parts, were:—

|                         |                       |
|-------------------------|-----------------------|
| Water . . . . .         | 0.110                 |
| Essential oil . . . . . | indefinable quantity. |

ALCOHOLIC EXTRACT.

|                                       |   |       |
|---------------------------------------|---|-------|
| Chlorophylle                          | } |       |
| Wax                                   |   |       |
| Resin                                 |   |       |
| Stearine                              |   |       |
| Peculiar matter (Lobeleine) . . . . . |   | 0.022 |
| Aromatic resin . . . . .              |   | 0.013 |
| Vegetable gluten . . . . .            |   | 0.028 |

AQUEOUS EXTRACT.

|                                                                                                   |       |
|---------------------------------------------------------------------------------------------------|-------|
| Mucilaginous gum . . . . .                                                                        | 0.060 |
| Salts of potassa, lime, magnesia, iron, and manganese, with organic and inorganic acids . . . . . | 0.024 |

POTASSÆ EXTRACT.

|                             |       |
|-----------------------------|-------|
| Mucilaginous gum . . . . .  | 0.424 |
| Vegetable fibrine . . . . . | 0.266 |

1.002

*Jahrb. f. Pract. Pharmacie.*

ART. VII.—*Preference of the Nitras argenti crystallisatus for fusing into the caustic case (porte-caustique), to Nitras argenit fusus.* By Dr. CARL SIGMUND, of Vienna.

IN fusing the *Nitras argenti fusus* into the caustic case (*porte-caustique*), &c. it does not always succeed if we bring the mass into an uniform surface of equal action; frequently small bubbles appear, the very thin sides are broken by applying the *porte-caustique* to the place on which it is intended to operate. This is not the case with the *Argent. nitr. crystall.*; as it yields, by fusion, a uniform, compact, and efficient mass, quite analogous to good *lapis infernalis*. The experience of the before-mentioned breaking of the fused mass, &c. may account for the recommendation to apply the *lapis infernalis* in whole pieces. The ar-

rangement required for this application may, however, be departed from if the Nitras argenti crystallis. is employed, and if the surface of the slide containing the caustic is not smooth but rough.—*Oesterr. Med. Wochenschr.*

## CHYMISTRY APPLIED TO AGRICULTURE.

### ART. VIII.—*Best Method of drying Plants for Herbaria.*

By Dr. GEISELER.

WITH the drying plants for the herbarium, some difficulty is attached, inasmuch as it requires a good deal of time to take the plants repeatedly out from the paper after it has become moistened, and to place them on dry paper; and because, also, the usual method of changing only the pieces of paper between the sheets in which the plants have been arranged, does not completely answer the purpose of preserving the natural colour. My assistant, Mr. Roland, has for some time pursued the following plan with perfect success:—

The plants are laid, as usual, between sheets of blotting paper, and slightly pressed for one night. The sheets, containing the plants, are then placed on the bottom of a chip sieve, previously covered with a simple layer of paper; not, however, precisely one above another, but rather beside each other, and in separate layers—these may amount to twelve or fifteen. Then the whole being again covered with a single sheet of paper, a quantity of moist sand, to the depth of two or three inches, is spread over the latter, and the sieve thus prepared placed in a baker's oven, or a drying room, until the plants are perfectly dry; which, according to the state of temperature, and to the greater or lesser watery contents of the plants, will be attained in one or two days. Plants containing a great deal of juice must not be pressed at all; but, after being placed in the paper, at once brought into the sieve, and covered with sand in the manner previously described. All plants dried carefully according to this method, preserve their natural colour, and require only to be left for a short time in a somewhat moist place, and to be pressed afterwards a little more, in order to appear perfectly prepared for the herbarium.—*Arch. d Pharm.* Nov. 1842.

## CHYMISTRY APPLIED TO MANUFACTURES.

### ART. IX.—*On the Fabrication of Potatoe-sugar, Wine, Brandy, and Vinegar.*

THE fabrication of sugar from secula by means of sulphuric acid has been carried to a great extent in France, partly because the price of potatoe starch and sulphuric acid are at present very

low, and partly because the starch syrup has received an extensive and varied application, viz.—

1. For sweetening and strengthening wine. On a cask containing 50 gallons of wine, from 10 to 20 pounds of starch syrup are employed.

2. For brewing, especially for manufacturing a species of pale beer.

3. The distillation of brandy.

4. Manufacturing vinegar.

5. For adulterating raw cane sugar.

There exist at present in France three large establishments for manufacturing starch sugar.

Payen has lately, in the *Moniteur Industriel*, published an instructive article on this subject. It has been calculated that if the manufacturer consumes daily three tons of potatoe-starch, and obtains therefrom four tons and a half of syrup, his daily profits amount to 55 francs=£2. 4s.

In one of these establishments the boiling is performed by means of steam, in another over the fire in large leaden boilers placed on iron plates of a convex form, and of the thickness of 15 lines= $1\frac{3}{8}$  inch, in order to effect the gradual distribution of heat.

One ton of water is first heated to the boiling point in these vessels, and twenty-two pounds of sulphuric acid of 60° Baumé=1.845 (previously diluted with twice its weight of water) added to it. The vessel is provided with a wooden cover coated with copper, which has near the rim an opening of about twelve or fifteen inches in width, thus allowing the liquor to be stirred by means of a wooden spatula, and through which, after the liquor begins to boil, about 8 cwt. of starch-flour is gradually sifted, continually stirring, in quantities of about one pound at a time: the formation of lumps is thus prevented, and the boiling uniformly continued. In some of these manufactories the starch-sugar being mixed with water is put in a vessel placed above the boiler, from which it flows into the boiling acid, in a uniform stream, by means of a tube, whereby the object sought, of a great quantity of the latter acting at once on a proportionately small portion of starch-flour, is attained in a manner which admirably promotes the formation of sugar; and this operation is almost instantly effected as soon as the whole of the starch-flour is carried down into the boiler; whilst by the former way, according to which the whole of the starch was at once mixed with the liquor, the manufacturer was obliged to continue the boiling for twenty-four hours (repeatedly replacing the evaporating water). At present the boiling is continued for not more than eight or ten minutes after the whole of the starch-flour has been brought into the acid liquor, in order to convert the contents of the boilers into syrup, and to obtain an almost transparent, very liquid solution, which, if tested with

tincture of iodine, does not assume any violet colour, and which, if a sample be taken out, does not appear glutinous or lumpy.

The fire is then regulated, so that the liquor ceases to boil; and this, in the event of the boiling being caused by steam, is managed by closing a tap: chalk is then added in about the same proportion as the concentrated sulphuric acid; that is to say, 22 lbs. Since, however, the chalk is not always of the same quality, the point of perfect saturation must be ascertained by tincture of litmus; a small excess of chalk is not prejudicial, and even advantageous, in order to be sure that the free acid is entirely removed. It scarcely requires the remark from us that the chalk should be added carefully and slowly, on account of the violent evolution of carbonic acid.

The sulphate of lime produced having deposited, the liquor is strained through coarsely triturated burnt bones, which is spread on straining cloths in wooden filtering frames. The sulphate of lime impure, which remains, is finally used as manure, being first washed with water; and this water afterwards employed for another process.

The filtered liquor is gradually brought into a flat pan, in which it is evaporated rapidly, until it is reduced to about one-half of its volume, and to a strength of 22 or 25° Baumé (=1.176 to 1.205 specific gravity), after which it is for the second time heated to boiling with charcoal and bullock's blood; then fined and filtered. One hundred parts of dry starch, or 150 of fresh, yielded 150 of syrup of 30° Baumé=1.256, equivalent to 100 parts of dry sugar, which is obtained by concentrating the syrup to 36° Baumé=1.324, decanting it into casks provided with taps, and slowly cooling it therein. At the expiration of two days the liquid syrup may be obtained by opening the taps, and the crystallized sugar is then found in the casks. In some manufactories the syrup is concentrated to from 40 to 50° Baumé=1.375 to 1.510, and then decanted into tinned-copper vessels, where the sugar on cooling consolidates to a granular and compact mass, without assuming the form of regular crystals.

Payen states that two persons, relieving each other during the work, are able to boil five different quantities in twenty-four hours, and to consume 2000 kilogr.=nearly two tons of starch-flour, if the work is conducted alternately in two boilers. He calculates the expense and proceeds of manufacturing this article according to the present state of the manufactories in France.

In Burgundy particularly a considerable quantity of starch-syrup is consumed, for the purpose of giving more body to wine. In manufacturing spirits of wine, the starch-sugar is to be preferred to the raw potatoe, enabling the distiller to obtain the spirit free from the empyreumatic oil, with which it is otherwise contaminated. The sugar and syrup of fecula are also extensively applied to other purposes—for instance, sweetening made dishes, confectionary, manufacture of blacking.



As much vinegar is manufactured from starch-syrup, it should be borne in mind, as regards the chymical tests with which it may be tried, that this vinegar, without being intentionally adulterated with sulphuric acid, nevertheless becomes turbid with chloride of barium, because it is difficult to remove completely the sulphate of lime formed during the process; and as the chalk used sometimes contains magnesia and potassa, or soda, several sulphates of these bases may occasionally be detected in syrup.

Gaultier de Claubry, in examining some vinegar manufactured from starch-syrup, found not only dextrine and gypsum, but even free sulphuric acid; probably because in manufacturing this vinegar too small a proportion of chalk had been employed. This vinegar yielded precipitates with chloride of barium, oxalate of ammonia, and nitrate of silver. A certain quantity of it was evaporated to one-fourth of its volume, and then mixed with spirit of wine, which produced a white flaky precipitate, consisting of chalk and dextrine, but not containing any spirit of wine. The dextrine dissolved in water, and the sulphate of lime was left behind; the aqueous solution of dextrine yielded on evaporation a gummy mass, which, after being boiled with nitric acid, did not yield any sulphuric acid. This proved that the vinegar had been manufactured from starch-syrup, and was not therefore wine vinegar.

One hundred parts, by weight, of this vinegar, gave, with chloride of barium, 1.038 of sulphate of barytes, indicating, by calculation, 0.610 of sulphate of lime: since, however, only 0.070 of gypsum were obtained by direct experiment, it followed therefrom that there was present sulphuric acid in excess. In order to arrive at a positive decision, 100 parts of vinegar were mixed with spirit of wine, in order to precipitate the gypsum and dextrine; the liquor was then filtered, concentrated by boiling, and further precipitated by chloride of barium. The sulphate of barytes produced weighed 0.841; showing, by calculation, 0.140 of free sulphuric acid in 100 parts of vinegar. Besides this, a portion of sulphuric ether may also be contained in this vinegar, arising from the spirit of wine present, and which is not precipitated by barytes.—B. R. (from the *Ann. d'Hygiène Publ.* t. xxvii. p. 36.)

## PRACTICAL PHARMACY.

### ART. X.—*Chloride of Sulphur.*

*Synonymes.*—Sulphur chloratum, or Chlorum hypersulfuratum, Hypochloretum sulfurosum, or Souschloure de Soufre, or Hypochloride of sulphur.

Is obtained by the immediate action of the several elements on each other in a suitable apparatus. It forms a yellowish-red liquid, of a highly penetrating and unpleasant smell, giving out

slight fumes in the air, and is more than one and a half times heavier than water; in contact with which it gradually decomposes into hydrochloric, sulphurous, and sulphuric acids. It consists of nearly equal parts of sulphur and chlorine, but is capable of absorbing as much again of chlorine, and also of dissolving sulphur. This compound was recommended for internal use by *Derksengi*, especially in old gouty affections combined with pains in the stomach; and also, with a salutary effect, in severe nervous fever, when it is taken dissolved in ether, in doses of ten drops, with old Hungary wine. It is used externally in *Psoriasis inveterata*.—*A. Duflos' Pharm. Chemie.*

#### ART. XI.—*Hyoscyamus.*

THE result of compilation, in lieu of accurate examination for themselves by those most interested in the above plant, has seldom been more plainly exemplified than in the recent essays which have appeared in reference thereto. We are desirous of suggesting to investigators certain cautions, to prevent, if possible, the appearance of still further discrepancies in relation to this important remedy.

A plant has recently (within six years) been introduced to the pharmaceutical chymist, grown chiefly at Mitcham. The seeds, by the *ipse dixit* of a cultivator, were first obtained from America; and the following are some of its characteristics, stated in the language of one who grows both varieties.

*The Annual Plant.*—It flowers, and produces seeds, about five months after sowing, and withers shortly after that time. The seeds of the annual plant are much lighter coloured than those of the biennial.

*Biennial.*—Produces no seeds in the first year, and does not wither until the end of the second season.

Our informant, moreover, states, that although a warranty is sometimes furnished to the pharmacist that it is the "two year plant," yet such warranty by no means binds the conscience of the herbalist vendor that it should be two years old, or arrived at the second season of its growth; and it is from this circumstance, most probably, certain views have been taken of the subject, and published for the guidance of inquirers. With such a supposition we can easily understand the views taken by some who have described the plant and its various parts, assuming that such botanists as aforesaid have had unfortunately the same species brought to them whereon to found their descriptions; the one being described as the "one-year plant," and the other the "two-year plant," by the less accurate and not very enthusiastic herbalist.

Such being the case, we recommend those who would distinguish themselves by the elucidation of this subject during the ensuing season, to grow for themselves, if only in a flower-pot;

and we beg to assure them, that very distinct characteristics in the stem, leaves, their position on the stalk, seed-vessels, and medicinal effects of extract (if made at a temperature of 60° *in vacuo* by Leslie's arrangement) will reward them for their investigation.

[Having samples of the seeds of both varieties forwarded by a correspondent, we shall be happy to furnish a few of each to any parties who may feel interested in the subject. In order to avoid mistakes, we must request such parties to write their address on a stamped envelope, and enclose the same to the care of our Publishers.—ED.]

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ART. XII.—TOXICOLOGY—*The Natural History and Uses of Fungi.*

[Continued from page 469.]

THE diagnosis between wholesome and unwholesome mushrooms is often difficult for the botanist, and impracticable for the un-instructed, the sensible qualities of the noxious and innoxious often closely resembling each other. The *amanita cæsaria*, called also *agaricus deliciosus*, for example, is probably the mushroom impiously called by the Jews "food for the Gods." It is a wholesome mushroom, as its name implies, of delicious flavour; yet it agrees in so many points with the deadly *agaricus muscarius*, that the latter has often been eaten for it. A difference of shade in the gills, or of perfectness in the bolea, are marks too little prominent to satisfy humanity. A pure golden yellow, especially of the gills, marks, it is said, a wholesome fungus, but a pale yellow an unwholesome one; but the difference is not great, and there are several exceptions. A wine red, or a violet hue, indicates salubrity, whereas an orange, or blood-red, are counter-indications; yet the *boletus nepaticus*, which is wholesome, has a blood-red juice. The *amanita bulbosa* has the same smell as the true mushroom or *agaricus campestris*, with which it often agrees also in the colour of its pileus. It has, accordingly, been often mistaken for the innocent plant which it so much resembles, and is, according to Paulet, the cause of the majority of cases of mushroom poisoning that happen in and about Paris and its vicinity. Fungi growing in damp and shady places, are generally, and perhaps with reason, looked upon as suspicious. De Candolle lays down four rules of distinguishing bad fungi from esculent. All mushrooms are esculent, he assures us, except—

- 1st. Coriaceous and ligneous kinds.
- 2d. Those that have collars on their stems.
- 3d. Those whose taste is acrid.
- 4th. Those which turn blue on being cut into, which last are always poisonous.

Dr. Grenville, in his paper on esculent fungi\*, recommends, as a rule, for the collectors of mushrooms, to reject those which are styptic and astringent, or that leave a bitter after taste, and those also which have a pungent and disagreeable smell. He advises, also, as a further measure of precaution, that before cooking, the hymenium should be removed, as the parts of fructification are sometimes bad, when the rest of the plant is wholesome.

Dr. Pearson† gives it as his opinion that two of the species of mushrooms only are fitted for food, and that all the rest are, to say the least of them, unsafe. These two species are the *agaricus campestris*, or common mushroom, and the *agaricus deliciosus*, or orange agaric. Some very excellent rules for the collection of mushrooms will likewise be found in a popular work lately published, from which the following observations are obtained:—

“Of the many species of fungi, thus much is certain, that all having the following characters are poisonous:—

“1st. Such as have a cup very thin in proportion to the gills.

“2dly. Such as have the stalk growing from one side of the cup.

“3dly. Those in which the gills are all of equal length.

“4thly. Such as have a milky juice.

“5thly. Such as deliquesce, that is, run speedily into a dark, watery fluid.

“And lastly, such as have the collar surrounding the stalk—filamentous, or resembling a spider's web.”

The writer of the article from which the above extract is made, likewise states that the only edible mushrooms are the *agaricus campestris*, or common mushroom, the *deliciosus*, and the *pratensis*, or fairy mushroom.

A writer in the Quarterly Journal of Science gives the following:—“Wherever a fungus is pleasant in flavour and odour, it may be considered wholesome; if, on the contrary, it have an offensive smell, a bitter, astringent, or styptic taste, or even if it leave an unpleasant flavour on the mouth, it should not be considered fit for food. The colour, figure, and texture of these vegetables do not afford any characters on which we may safely rely; yet it may be remarked, that in colour, the pure yellow, gold colour, bluish pale, dark or lustre brown, wine red, or the violet, belong to many that are esculent; whilst the pale or sulphur yellow, bright or blood red, and the greenish, belong to few but the poisonous. The safe kinds have most frequently a compact, brittle texture; the flesh is white; they grow more readily in open places, such as dry pastures and waste lands, than in places humid, or shaded by wood. In general those

\* Wernerian Transactions, Vol. 1.

† Arranged Catalogues of the Articles of Food, Drink, &c. &c., by G. Pearson, M.D. London, 1807.

should be suspected which grow in caverns and subterraneous passages, on animal matter undergoing putrefaction, as well as those whose flesh is soft and watery."

Until very lately there was no chemical evidence of the existence of any peculiar principle in fungi, by means of which their deleterious action could be explained. M. Letellier has, he alleges, discovered in the *agaricus muscarius*, and two other eminently noxious fungi, two poisonous elements, the one possessed of irritant, the other of narcotic properties; the former principle too fugacious to admit of satisfactory examination, the other apparently an alcaloid substance, without smell or taste, forming salts with acids, and having opiate properties: the latter he calls *emanitine*. But these statements of M. Lettier's, however probable, obviously need confirmation. Before the publication of his experiments, toxicologists seem to have been almost wholly in the dark relative to the nature of mushroom poison. The existence of a very fugacious, noxious principle, indeed, was more than suspected. Brainerd\* informs us, that he has met with a volatile acid principle, but with these exceptions, little more was ascertained than that many of the fungi were noxious. With regard to the external conditions, also, of salubrity or noxiousness, we are even now little better informed than the ancients; and though we are satisfied that the breath of the vipers mentioned by Miander, and after him by Dioscorides, Pliny, and others, was but an imaginary cause of mushroom vapours, and that mephytic vapours, contact with rusty iron or with rotten linen, are equally fanciful with the former, yet the real cause why fungi, wholesome to some persons, or in particular seasons, or growing in particular places, soils, or climates, are, in other circumstances, injurious, are to this hour but very imperfectly known to us. But in the present state of biology, and with our very slight acquaintance with the nature and extent of physical agency on organic life, such ignorance is in no way surprising.

The next subjects presenting themselves for consideration are naturally the treatment and morbid appearances. The first step in mushroom poisoning is invariably to effect the expulsion of the poison, if still present; and as there are no poisonous substances of equal power, so, at the same time, there are none in which emetics may be administered with equal prospects of success at advanced stages, or rather after the intervals between the ingestion of the poison and the commencement of the treatment. The poisonous substance should, therefore, be first evacuated by emetics or purgatives, or by combinations of these; for example, three or four grains of tartar emetic, or twenty-four grains of ipecacuanha powder, in solution, with two ounces of sulphate of soda. Castor oil is a valuable purgative in these

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\* *Annales de Chemie*, Vols. 79, 80, and 89.

cases. The lancet is sometimes necessary. After the stomach and bowels have been emptied, small but repeated doses of ether in mucilage should be administered, and at the same time the stomach should be diluted with vinegar and other acidulous fluids. The debility subsequent to the effects of these poisons, when the fatal issue is averted, may be treated with cinchona and other tonics.

*Morbid Appearances.*—There remain, for brief consideration, the morbid appearances observed in the bodies of the victims of poisonous fungi. From what has been said of the symptoms and physiological effects of the poisonous mushrooms, the nature of the organic lesions it produces may be pretty correctly inferred; they relate principally to the gullet and brain. In the abdomen are observed meteorism, vascularity of the mucous membranes, and even of the whole thickness of the gut, sometimes approaching, or actually attaining to, gangrenous inflammation. Of these changes, as might be expected, the stomach is the principal seat; but the whole tube is liable to suffer. The vessels of the brain have been found much distended, the membranes injected, and the substance itself preternaturally vascular; further, the blood has been found quite fluid, so as to escape from its proper channels into the cavities and out of the natural outlets of the body. The lungs also have been observed in a state of congestion, and even of inflammation, owing, also, to the difficult solubility of the flesh of all fungi. It is usual, if vomiting have not happened, and death has taken place within a day or two of the ingestion of the poison, to find fragments of the mushroom more or less entire, and recognisable among the contents of the intestines. On the whole, when we take into consideration all the circumstances of the history of the fungi which may be adduced in proof of their objectionableness as a regular or principle article of diet, viz. :—

1st. The difficult digestibility of the most harmless.

2dly. The difficulty, in many cases, of practically distinguishing between regularly esculent and unwholesome fungi.

3dly. The occasional insolubility of those which are generally wholesome.

4thly. The great number as well as the deceptive appearances of the most noxious sorts.

5thly. The facility that a more general use and popular familiarity with these plants would furnish to the assassin;—when we take these considerations into account, we cannot regret that the mushroom forms so insignificant an article in the dietary of the British public; or that, so far, at least, as British experience is concerned, our opportunities of enlarging its toxicological history have been, and are, so much more scanty than those of our continental brethren.

*Test.*—There are no means of ascertaining that a person has

been poisoned by these vegetables, unless some of the plants be found, in which case their deleterious properties are known by their botanical characters.

G. T. F.

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## GALVANISM AND ELECTRICITY.

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### ART. XIII.—*On Electrical Impressions.* By G. KARSTEN.

DR. RIESS describes, in the *Repertorium der Physik*, vol. vi. p. 180 ff, certain electrical figures which he terms electrical-Hauchfiguren (figures produced by breathing). I obtained these figures most perfectly by charging a Franklin plate, the one surface of which was moveable, and discharging it, after having removed the face, when the design, which appeared during the luminous phenomenon, re-appeared after breathing upon the plates. Some places, therefore, had, during the action of electricity, assumed the property of being untouched by aqueous vapour. The analogy of these figures with those of Moser appeared to me so striking, that I undertook experiments in order to produce these impressions by the agency of electricity. For this purpose I placed a coin on plate glass, being supported by a plate of metal not isolated, and then caused the sparks from the conductor of the machine to strike on the coin, thereby causing the shock to pass simultaneously through the coin and the metallic plate. After one hundred turns of the machine (the diameter of the disk is 20") I removed the coin; the glass plate appeared perfectly unaltered, but when breathed upon a perfect impression of the coin in its most minute details became visible.

The following questions then arose:—Is the impression produced by traces of the electric fluid remaining adherent to the glass-plate? Is it produced in the same manner as those observed by Moser; that is to say, by the action of light? Can similar impressions be produced on a metal? What are the conditions of this process? In what manner may these impressions be fixed?

I most decidedly negative the first question. It is true that, immediately after the electrical action has taken place, traces of electricity can still be observed on the glass-plate. These, however, disappear completely after it has been wiped with a handkerchief, or after being laid down for some time; while the impression still remains with great distinctness, and it is difficult to remove the traces of the impression even by strongly rubbing the plate, heating, or breathing on it, which is frequently an impediment for other experiments. Another reason which does not allow the inference that some traces of electricity might still be retained, is the fact that these impressions are neither destroyed, nor even weakened, by passing a stream of the opposite

electricity over them, since both positive and negative electricity have precisely the same effect thereupon.

Still more decisive, however, is the fact, that I likewise obtained impressions on polished metallic plates (but with certain precautions, as I shall presently show); in which case, therefore, partial adhesion of electricity is quite out of question. The impressions, therefore, cannot be the result of electricity still adhering to the plate.

Another question is, whether they are produced by an action which is similar to that which has produced the impressions observed by Moser; or whether they may be ascribed to peculiar electric action. The fact that this process is finished in a very short time, as compared with that required for the formation of the impressions observed by Moser, does not admit of this inference being correct. A few turns are sufficient to produce outlines of the coins on the glass plate, and the time required for three hundred revolutions—a space of time in comparison with which the time required for obtaining impressions on metallic plates is very inconsiderable.

It might be objected that the intensity of light is in this case so considerable that this short space of time is sufficient for obtaining impressions. To this objection we, however, reply that a less perfect impression is obtained by the action of the battery; although the intensity of the light is undoubtedly much greater in this case. I further insulated the coin by means of sealing wax, and removed it by one line from the glass plate: the sparks struck from the brim of the coin immediately over to the metallic plate; and, notwithstanding this, I obtained an impression without any phenomenon of light appearing between the coin and the glass plate, even in the dark.

The dark, as they are called, or invisible rays of light, could therefore only be received in explanation; but, as regards these also, no such intense action is known; and it would in this case be necessary to presume that those peculiar rays which produce the effect now under inquiry are especially and principally contained in electric light, or the electrical fluid: since this supposition, however, cannot be supported, at any rate at the present moment, by any proof, they must be presumed, it appears, until further explained, as peculiar to electricity.

Respecting the conditions under which we may succeed in obtaining these impressions at present, I can state as follows:—1stly. Much appears to depend on the quality of the glass; the impressions appear as distinct on thick glass as on thin glass, with the exception, that if coins are placed on both sides of the glass-plates, which are then acted upon, and affected in the same manner as the surface of the plate. If thin plates are used, several sheets may be placed one above the other, which then yield impressions, indeed, gradually less distinct, but still quite perceptible. Another point is, the chymical quality of

[Continued on page 520.]



| NOMINA.                                  | FORMULÆ.                                                                                |
|------------------------------------------|-----------------------------------------------------------------------------------------|
| <i>Carbonas</i> Cericus . . . . .        | $\ddot{\text{Ce}}, \ddot{\text{C}}^3. . . . .$                                          |
| — Cerosus . . . . .                      | $\frac{1}{3}. . . . .$                                                                  |
| — — c. a. . . . .                        | $\ddot{\text{Ce}} \ddot{\text{C}} . . . . .$                                            |
| <i>sub Carbonas</i> Chromicus . . . . .  | $\ddot{\text{Ce}} \ddot{\text{C}} + 2\ddot{\text{H}}_2 . . . . .$                       |
| <i>Carbonas</i> Cobalticus . . . . .     | $\ddot{\text{Cr}}_2 \ddot{\text{C}}^3 + \ddot{\text{Cr}}_2 \ddot{\text{H}}_2 . . . . .$ |
| — Cupricus . . . . .                     | $\ddot{\text{Co}} \ddot{\text{C}} . . . . .$                                            |
| <i>sub Carbonas</i> Cupricus . . . . .   | $\ddot{\text{Cu}} \ddot{\text{C}} . . . . .$                                            |
| <i>Carbonas</i> bi Cupricus . . . . .    | $2\ddot{\text{Cu}} \ddot{\text{C}} + \ddot{\text{Cu}} \ddot{\text{H}}_2 . . . . .$      |
| — — cum aqua . . . . .                   | $\ddot{\text{Cu}}^2 \ddot{\text{C}} . . . . .$                                          |
| — Cuprosus . . . . .                     | $\ddot{\text{Cu}}^2 \ddot{\text{C}} + \ddot{\text{H}}_2 . . . . .$                      |
| — Ferrosus . . . . .                     | $\ddot{\text{Cu}}_2 \ddot{\text{C}} . . . . .$                                          |
| — Glucanicus . . . . .                   | $\ddot{\text{Fe}} \ddot{\text{C}} . . . . .$                                            |
| — — — — —                                | $\ddot{\text{G}}_2 \ddot{\text{C}}^3 . . . . .$                                         |
| — Hydrargyricus . . . . .                | $\frac{1}{3}. . . . .$                                                                  |
| — Hydrargyrosus . . . . .                | $\text{Hg} \ddot{\text{C}} . . . . .$                                                   |
| — Kalicus . . . . .                      | $\text{Hg}_2 \ddot{\text{C}} . . . . .$                                                 |
| — — c. a. . . . .                        | $\ddot{\text{K}} \ddot{\text{C}} . . . . .$                                             |
| <i>sesqui Carbonas</i> Kalicus . . . . . | $\ddot{\text{K}} \ddot{\text{C}} + 2\ddot{\text{H}}_2 . . . . .$                        |
| <i>bi Carbonas</i> Kalicus . . . . .     | $\ddot{\text{K}}^2 \ddot{\text{C}}^3 . . . . .$                                         |
| — — — — —                                | $\ddot{\text{K}} \ddot{\text{C}}_2 . . . . .$                                           |
| — — — — —                                | $\frac{1}{3}. . . . .$                                                                  |
| — — — — —                                | $\ddot{\text{K}} \ddot{\text{C}}^2 + \ddot{\text{H}}_2 . . . . .$                       |
| <i>Carbonas</i> Lithicus . . . . .       | $\ddot{\text{L}} \ddot{\text{C}} . . . . .$                                             |
| — Magnesicus . . . . .                   | $\ddot{\text{Mg}} \ddot{\text{C}} . . . . .$                                            |
| — Magnesicus c. a. . . . .               | $\ddot{\text{Mg}} \ddot{\text{C}} + 2\ddot{\text{H}}_2 . . . . .$                       |
| <i>sub Carbonas</i> Magnesicus . . . . . | $3\ddot{\text{Mg}} \ddot{\text{C}} + \ddot{\text{Mg}} \ddot{\text{H}}_2 . . . . .$      |
| <i>bi Carbonas</i> Magnesicus. . . . .   | $\ddot{\text{Mg}} \ddot{\text{C}}^2 . . . . .$                                          |

| PONDERA ATOMORUM. |                    | PARTES CENTESIMALES. |       |                      |
|-------------------|--------------------|----------------------|-------|----------------------|
| O = 100           | H <sub>2</sub> = 1 | + E                  | — E   | H vel H <sub>2</sub> |
| 2278,71           | 182,60             | 63,61                | 36,39 |                      |
| 759,57            | 60,87              |                      |       |                      |
| 951,13            | 76,22              | 70,94                | 29,06 |                      |
| 1176,10           | 94,24              | 57,37                | 23,50 | 19,13                |
| 5181,28           | 415,18             | 77,48                | 16,01 | 6,51                 |
| 745,43            | 59,73              | 62,92                | 37,08 |                      |
| 772,13            | 61,87              | 64,20                | 35,80 |                      |
| 1876,00           | 150,33             | 79,27                | 14,74 | 5,99                 |
| 1267,83           | 101,59             | 78,20                | 21,80 |                      |
| 1380,31           | 110,61             | 71,82                | 20,03 | 8,15                 |
| 1167,83           | 93,58              | 76,33                | 23,67 |                      |
| 715,64            | 57,35              | 61,37                | 38,63 |                      |
| 1791,83           | 143,58             | 53,72                | 46,28 |                      |
| 597,28            | 47,86              |                      |       |                      |
| 1642,26           | 131,60             | 83,17                | 16,83 |                      |
| 2908,08           | 233,03             | 90,49                | 9,51  |                      |
| 866,35            | 69,42              | 68,09                | 31,91 |                      |
| 1091,31           | 87,45              | 54,06                | 25,33 | 20,61                |
| 2009,15           | 160,99             | 58,72                | 41,28 |                      |
| 1142,79           | 91,57              | 51,62                | 48,38 |                      |
| 571,40            | 45,79              |                      |       |                      |
| 1255,27           | 100,61             | 47,00                | 44,04 | 8,96                 |
| 456,77            | 36,60              | 39,48                | 60,52 |                      |
| 534,79            | 42,85              | 48,31                | 51,69 |                      |
| 272,23            | 69,89              | 29,62                | 61,69 | 38,69                |
| 1759,77           | 141,01             | 58,72                | 15,71 | 25,57                |
| 811,23            | 65,00              | 31,85                | 68,15 |                      |

| NOMINA.                                 | FORMULÆ.                                                         |
|-----------------------------------------|------------------------------------------------------------------|
| <i>bi Carbonas</i> Magneticus . . . .   | $\frac{1}{2}$ . . . . .                                          |
| <i>Carbonas</i> Manganosus . . . .      | Mn $\ddot{C}$ . . . . .                                          |
| — Molybdosus . . . .                    | Mo $\ddot{C}$ . . . . .                                          |
| — Natricus . . . .                      | Na $\ddot{C}$ . . . . .                                          |
| — — c. a. . . .                         | Na $\ddot{C}$ + 10 H <sub>2</sub> . . .                          |
|                                         | Na $\ddot{C}$ + 5 H <sub>2</sub> . . .                           |
| <i>sesqui Carbonas</i> Natricus . . . . | Na <sup>2</sup> $\ddot{C}$ <sup>3</sup> . . . . .                |
| — — — c. a. . .                         | Na <sup>2</sup> $\ddot{C}$ <sup>3</sup> + 4 H <sub>2</sub> . . . |
| <i>bi Carbonas</i> Natricus . . . .     | Na $\ddot{C}$ <sup>2</sup> . . . . .                             |
| — — — c. a. . .                         | $\frac{1}{2}$ . . . . .                                          |
|                                         | Na $\ddot{C}$ <sup>2</sup> + H <sub>2</sub> . . .                |
|                                         | Na $\ddot{C}$ + 2 H <sub>2</sub> . . .                           |
| <i>Carbonas</i> Niccolicus . . . .      | Ni $\ddot{C}$ . . . . .                                          |
| — Palladosus . . . .                    | Pd $\ddot{C}$ . . . . .                                          |
| — Platinosus . . . .                    | Pt $\ddot{C}$ . . . . .                                          |
| — Plumbicus . . . .                     | Pb $\ddot{C}$ . . . . .                                          |
| — Rhodicus . . . .                      | R <sub>2</sub> $\ddot{C}$ <sup>3</sup> . . . . .                 |
|                                         | $\frac{1}{2}$ . . . . .                                          |
| — Stronticus . . . .                    | Sr $\ddot{C}$ <sup>2</sup> . . . . .                             |
| — Telluricus . . . .                    | Te $\ddot{C}$ <sup>2</sup> . . . . .                             |
|                                         | $\frac{1}{2}$ . . . . .                                          |
| — Thoricus . . . .                      | Th $\ddot{C}$ . . . . .                                          |
| — Uranicus . . . .                      | U <sub>2</sub> $\ddot{C}$ <sup>3</sup> . . . . .                 |
|                                         | $\frac{1}{2}$ . . . . .                                          |
| — Vanadicus . . . .                     | V $\ddot{C}$ <sup>2</sup> . . . . .                              |
|                                         | $\frac{1}{2}$ . . . . .                                          |
| — Yttricus . . . .                      | Y $\ddot{C}$ . . . . .                                           |

| PONDERA ATOMORUM. |                    | PARTES CENTESIMALES. |       |                      |
|-------------------|--------------------|----------------------|-------|----------------------|
| O = 100           | H <sub>a</sub> = 1 | + E                  | — E   | H vel H <sub>a</sub> |
| 405,61            | 32,50              |                      |       |                      |
| 722,33            | 57,88              | 61,73                | 38,27 |                      |
| 974,96            | 78,12              | 71,65                | 28,35 |                      |
| 667,34            | 53,47              | 58,58                | 41,42 |                      |
| 1792,13           | 143,61             | 21,81                | 15,43 | 62,76                |
| 1229,73           | 98,54              | 31,79                | 22,48 | 45,73                |
| 1611,11           | 129,10             | 48,53                | 51,47 |                      |
| 2061,03           | 165,15             | 37,93                | 40,24 | 21,83                |
| 943,77            | 75,63              | 41,42                | 58,58 |                      |
| 461,99            | 37,81              |                      |       |                      |
| 1056,25           | 84,64              | 37,01                | 52,34 | 10,65                |
| 1168,73           | 93,63              | 33,45                | 47,30 | 19,25                |
| 746,11            | 59,79              | 62,95                | 37,05 |                      |
| 1042,34           | 83,52              | 73,48                | 26,52 |                      |
| 1609,94           | 129,00             | 82,83                | 17,17 |                      |
| 1670,94           | 133,89             | 83,46                | 16,54 |                      |
| 2432,09           | 194,89             | 85,90                | 34,10 |                      |
| 810,70            | 64,96              |                      |       |                      |
| 923,72            | 74,02              | 70,07                | 29,93 |                      |
| 1554,64           | 124,57             | 64,44                | 35,56 |                      |
| 777,32            | 62,29              |                      |       |                      |
| 1121,34           | 89,85              | 73,35                | 24,65 |                      |
| 6552,03           | 525,02             | 87,34                | 12,66 |                      |
| 2184,01           | 175,01             |                      |       |                      |
| 1601,77           | 128,99             | 65,65                | 34,35 |                      |
| 804,88            | 64,50              |                      |       |                      |
| 778,95            | 63,42              | 64,51                | 35,49 |                      |

ON ELECTRICAL IMPRESSIONS—*continued from page 515.*

the glass, *ceteris paribus*, when the quality of the plates varied. I obtained, on different glass-plates, impressions in very different states of perfection. It seems immaterial whether the ball of the conductor touches the coin, or whether the electric fluid passes in the shape of sparks; on the other hand, it is very material to the distinctness and accuracy of the impression, whether sparks are made to strike from the coin to the exterior metallic foil; in cases where the electric fluid slowly escaped from the coin, the impressions were less distinct.

I obtained the best impressions on metallic plates, by placing a piece of oiled paper between the coin and the plate, thus somewhat retarding the passing of the electric fluid; impressions were, however, likewise formed when the coin was in immediate contact with the metallic plate. I do not venture upon the assertion, that the metallic quality of the coin is of any influence; the coins, however fabricated from the better conducting metals, appeared to yield better impressions. Powerful shocks from a jar or battery, as already mentioned, do not produce the same effect; at least as many turns are required, if a battery is employed, and more if a jar, in order to obtain an impression of the same distinctness. This may arise from various causes. In the jar, as well as in the battery, a residuary charge is always left behind; the quantity of electric fluid is not, therefore, alike in both cases, and the power of the electrical machine is weakened the nearer the jar or battery approaches to the point of being completely charged. Positive and negative electricity appear to produce the same effect. I have not yet, however, made a sufficient number of experiments in this respect.

I have hitherto succeeded but very imperfectly in fixing these impressions. It is true that the impressions on glass plates became visible during the action of fumes from quicksilver and iodine; but they disappeared instantly on being removed from the apparatus. The impressions on metal may be fixed by fumes of iodine or quicksilver, but not uniformly and distinctly; arising, perhaps, from a want of skill in the treatment, or from the apparatus not being properly arranged.

The observation that a weak insulator should intervene for the purpose of securing good impressions on metal, led me to the inference that the galvanic current might be employed for producing those impressions. I have, however, hitherto barely obtained some slight traces of an impression; but I feel convinced that more satisfactory results may be obtained by similar means, if properly employed and directed.—*Poggendorff's Annalen*, 1842, No. 11.

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\* \* \* *Communications, Books for Review, &c. are requested to be addressed*—“To the Editors of the ANNALS OF CHYMISTRY, care of Messrs. Longman, Brown, and Co. Paternoster Row.”

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THE  
ANNALS OF CHYMISTRY  
AND  
PRACTICAL PHARMACY.

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No. 17.]      FRIDAY, JANUARY 20, 1843.      [VOL. I.

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IMPROVEMENT OF THE DRUG TRADE.

A SUPERFICIAL observer, judging from the first glance, might suppose that it would be perfectly easy for any body of men, intent upon the advancement of their own class, to plan a system, and lay down a code of rules, calculated to effect their design.

Yet a little experience, or even a little reflection, will show how vain is this expectation. We would remind those who theorize perfection, and attack not merely their decided opponents, but even their doubting friends, of the fate which has attended so many well-meaning societies. Here the failure has been among journeymen eager to raise wages ; and there among *dilettanti* solicitous to advance the arts ; but each failure alike tells us of the frailty of human nature, and shows how often perfection on paper becomes mere squabble in the debating-room.

The founders of a society, destined to succeed, must be zealous and persevering : your brilliant orator may shine on holiday occasions, and gratify an annual audience with his pleasant speeches ; but the business of a society must be transacted by the laborious committee-man, good-tempered, punctual, and untiring. Nay more ; the heads of such a society, far from fostering envy, hatred, and malice, in their own bosoms—far from bringing on this motion to worry Titius, or opposing that one, to humble Caius—will know how to crush these miserable passions, when exuberating in the breasts of others. So that a good president, or active committee-man, should have the qualities sought for in the superintendant of a lunatic asylum : he must be very firm, yet very mild : must remain calm amidst the

effervescence of others, and tolerate the feelings with which he cannot sympathize.

Without this happy bond of union, the disjointed attempts of individuals will end in smoke ; and too often the society will be dissolved amidst endless misunderstandings and recrimination. The sticks, says the old fable, which no force could break when united, were easily snapped asunder when separated. Now, the leading men of a society are the ligaments which unite its constituent parts into one harmonious whole ; if they are strong, the bundle is an infrangible mass ; if they are weak, the bundle is resolved into single twigs, incapable of resistance. The zeal of such a society, or of the leaders who rule it, must be directed to some laudable object ; for the common sense of the public would take alarm at any association which should cry "improvement !" but merely mean monopoly.

"Do you seek a charter ?" asks Sir James Graham. "We do," answer the druggists, with a firm voice. "Then what guarantee do you offer in return ?" The most satisfactory reply would be, "the examination (after the lapse of a few years) of all future candidates for the profession, and, if necessary, certain other restrictions to be imposed upon us."

It is clear that no one would propose an examination of those already engaged in the business. Indeed, if an examination were to be instituted immediately, scarcely one druggist in a hundred (gentle reader, you are that one,) could pass it without preparation. A few years must also elapse before the commencement of the examination, to allow time for the entrance into the profession of the majority of those who have already begun their apprenticeship ; for it might seem hard to force those who began their career with humbler pretensions, to rise at once to the modern and better standard. It is right, or at any rate it is customary in such matters, to err on the side of leniency ; and two or three years should be allowed to intervene for this purpose. To give more than three years for this purpose would certainly be inexpedient ; as so long an interval would be more than sufficient to prepare the most sluggish pupil for his ordeal. Instead of lamenting the hard destiny which compels him to study his profession, the apprentice who is be-

yond the supposed years of grace, should rather exult in the reformed system which leads him to the sciences ancillary to his art.

—————" For ignorance is the curse of God ;  
Knowledge the wing wherewith we fly to heaven."

But, supposing that Parliamentary relief should not come, at least for the present, can we do nothing for ourselves by internal reform? *Aide-toi, le ciel t'aidera* ; and the profession which has corrected some of its more glaring errors, may then call upon the legislature for assistance with a greater chance of being listened to. Would not a tariff of prices, to be adopted by all the members of the Pharmaceutical Society, be a means to this end? Suppose our present ones were increased in the proportion of six to five, or, in other words, that one-fifth was added to the existing charges, the consumption of drugs would not be perceptibly diminished; our prices would still be less in proportion than those on the continent; and the druggist's profits would be agreeably increased. He could then bear the income-tax without groaning.

Such are the methods we would suggest for improving the drug-trade. We cannot agree with the correspondent who has favoured us with two letters under the signature of *Pharmacopola*, in his proposal to limit the druggists' shops of a town to the number it may seem to require. The examination will thin our population to a certain extent; beyond that the druggist must ask nothing, but a fair field and no favour.

## CHYMISTRY, OPERATIVE AND EXPERIMENTAL.

ART. II.—*Elementary Course of Pharmacy, chiefly from the German of P. A. Cap and Rudolph Brandes, collated with the Works of Phœbus, Soubeiran, Guibourt, Lecanu, Duflos, Gmelin, &c. &c.*

[Continued from page 502.]

§ 36. The cause of pharmaceutical nomenclature being so very complicated arises from the great number of objects connected with pharmacy. Each different epoch, school, and scientific system, has attached different names to the same objects.

We have previously adverted to the distinction between drugs



and remedies; this distinction, however, only exists in a scientific point of view, and as the drugs contained in the chymist's shop are already prepared for medical use, they are usually termed medicines (*medicamina*). All the remedies contained in a druggist's shop, ready to aid the physician in the practice of his art, are divided into *simple* and *compound medicines*.

A *simple medicine* is either the natural body itself or one or another of its parts prepared in various ways for medical use, or the result of a practical operation on the natural substance for the purpose of separating or elucidating its efficient elements — *division* and *extraction*.

A *compound medicine* is the result either of mixture or a combination of a certain number of natural substances—*mixture* and *combination*.

§ 37. *Different classes of medicines.*—The whole of the medicines in a chymist's shop, therefore, may be classed under one of the following four classes:—

I. *Raw Substances, Cruda.*—The nomenclature of these substances is derived from the different systems of natural history, *e. g.*, *Rosa Gallica, Catharis vesicans, &c.*

II. *Extracts.*—The names of the medicines of this class are formed from those of the natural substances, which are their base, or from which they are obtained, and the designation of the process by which they are obtained, *e. g.*, *Pulpa Tamarindorum, Extractum Conii*.

III. *Mixtures.*—The names of these medicines are formed from the name of the substance which is their chief base, and the name of that substance in which the former is dissolved, or with which it is mixed; this latter is termed the *Excipien*, or *Vehiculum*, *e. g.*, *Oxymel, Scillae, Syrupus Althaeae*.

IV. *Combinations.*—The denomination of these bodies is derived from chymistry.

§ 38. *Pharmaceutical Nomenclature.*—Pharmaceutical nomenclature does not always agree with the systematic nomenclature of natural history or chymistry. The natural sciences, like all those based on experience, are subject to continual progress, and together with the perfection of their systems, a great number of the denominations of the bodies appertaining to their demesne is generally altered. Although pharmacy participates in the progress of the natural sciences, and must be allowed to follow them without restriction, its nomenclature cannot, however, be continually altered, as may that of these sciences; and, although following the real changes occurring in them, it requires greater stability in its nomenclature in order to avoid much inconvenience, which would otherwise accrue to the druggist as well as to the physician from continual change. Many medicines originating in former times still preserve names

which for a long time have already disappeared from scientific systems; recent remedies, on the other hand, are furnished with names answering to the present state of science, which, however, after a longer or shorter lapse of time, may not further answer the strict claims of science, and it is for this reason pharmaceutical nomenclature has become a motley mixture of expressive and insignificant, of scientific and unscientific, names. However it may be, this nomenclature contains those names of medicines which are inscribed on the vessels in which they are kept, and expresses such names by which the formulæ of the physician, or receipts, are prescribed. It is, therefore, indispensable that they should be perfectly known, as a want of this knowledge would lead to the most injurious mistakes; and the young pharmacist must render himself perfectly acquainted with pharmaceutical nomenclature.

It would be a very desirable alteration if the pharmaceutical nomenclature could receive a more convenient form than it possesses at the present time at least, and more especially in its chymical branch. To realize, and still more to introduce such an alteration generally, however desirable it might be, and very many valuable preliminary endeavours have already been made, would; notwithstanding, involve many difficulties.

§ 39. *Nomenclature of Medicines of the First Class.*—In order to familiarize himself with the different demonstrations, which else would impede the young pharmacist at every step of his studies, he must first acquire an exact idea of the systems of nomenclature, according to the four classes of medicines previously mentioned, are arranged in conformity with the several sciences connected therewith.

Natural history forming the three branches—mineralogy, botany, and zoology—has adopted a uniform nomenclature for the denomination of all the objects appertaining to its dominion. The classification of all natural bodies is founded on a system of divisions and subdivisions into which those objects are distributed, according to their characteristic properties.

In each of these sciences all natural bodies which form the objects of study are first divided into *classes*, for the determination of which such characteristics are selected as may be deemed the most essential; and in proportion as these appertain in common to a greater number of them. The classes are subdivided into orders (*ordines*), and these into *families*. Each family embraces a certain number of *genders* (genera), and each gender (genera) is divided into *kinds* (species), in which latter, frequently, *varieties* (varietates) are still distinguished. Respecting the systematic names of the bodies, we are obliged to limit ourselves to the shortest possible denominations, which, however, it is necessary should be capable of defining the place

which the body takes in the classification, and of indicating the body itself. This denomination, therefore, consists only of two words. The first is always a noun—it is the name of the gender, the *generic name*; wherefore it frequently indicates by itself a numerous group of analogous bodies; thus this name is sufficient for pointing out easily the family to which the gender appertains, even as the name of the family reminds us of the order and the class in which the family has its place. The second word is generally an adjective, designating the species, the *specific name*, indicating, therefore, the kind of gender. These two words are sufficient for indicating, precisely, any natural body, since the varieties which, besides this, are not very numerous, are founded on characteristics which may be easily discerned, and are of less importance. The name *Rosa Gallica* may serve as an instance. The word *Rosa* is the generic name. The young student will find, from any botanical compendium, that the gender *Rosa* appertains to the family of *Rosacea*, which finds its place in the tenth order, and the fourteenth class of the natural system. The word *Gallica* is the specific name, and serves to distinguish this species from all others appertaining to the same gender. From the varieties of the species, it is not difficult to distinguish them, as they differ only in the colour of the blossom, or their growth, or other subordinate characters. Any doubt respecting the plant designed by the two names mentioned is therefore removed.

Mineralogy and zoology have a perfectly analogous system of nomenclature. The young student is, therefore, able to discern a medicine of the first class, that is to say, a simple raw substance or drug, without any trouble, by the mere name of the label. In order, however, to acquire, by an easier method, a knowledge of the medicines commonly in use, and for which, alone, the name of *materia medica* should be reserved, he should study the method adopted in the classification of natural history, the elements of which will follow in the third part of this treatise. At first he must confine his attention to elementary principles, and endeavour to become acquainted with the methodical divisions into which the natural bodies, which one after the other become the object of his observations, are distributed. Thus he acquires a knowledge of the principles on which the systems of the different sciences are based, and learns to distinguish a great number of characteristics indispensable to an exact acquaintance with those bodies.

§ 40. *Nomenclature of the Medicines of Second and Third Class.*—The medicines of the second and third class, extracts and mixtures, are those which chiefly possess a peculiar pharmaceutical nomenclature, since those of the first class derive their names chiefly from natural history, and those of the fourth from

chemistry. It is, however, as already observed, very unfortunate that the great number of medicines of the second and third class, as well as their great variety of forms and compositions, have rendered their classification as well as their nomenclature a task of very great difficulty. The endeavours made to this end at different times, have, however, contributed to throw much light on this subject. The reform taking place during the course of the last century in the language of many sciences, had long made it desirable to introduce similar improvement into pharmacy. Some distinguished pharmacopolists, as Hagen, Bucholz, Trommsdorff, the authors of the Russian and French pharmacopœias, and others, had already introduced some very advantageous alterations in this nomenclature, when Chereau proposed a plan for its general reform. His essay of nomenclature, founded on very acute observation of the characters and combinations of medicines, and based on a rational classification, contains many happy alterations, which have already partly been introduced into the science. Another excellent work on this subject has since been published by Beral, in which some new names instead of those previously proposed, and a great number of those for a long time in use, occur. To these may be added the more recent work of Brandes on this subject; and we shall likewise partly employ these terms in the future course of this treatise.

[To be continued.]

### ART. III.—*Cyanide of Potassium.*

*Synonymes.*—Kalis hydrocyanicum s. cyanetum s. cyanuretum s. cyanidum kalicum s. potassium, kalium cyanatum s. cyanogenatum, cyanhydras s. hydrocyanas s. prussias kalicus s. potassicus s. potassæ s. lixivie, cyanure de potassium, prussiate de potasse cyankalium.

This preparation, which has lately been recommended for medical purposes, is prepared by introducing prussic acid in the gaseous form into a solution consisting of 1 part of caustic potassa, dissolved in 6 parts of pure alcohol, until the odour of the former preponderates; then collecting the disengaged combination into a filter, drying it by pressure between folds of bibulous paper, and preserving it in a well-closed vessel. Prepared in this way cyanide of potassium forms a white saline powder, containing in 100 parts 40.24 (=41.5 of prussic acid) of cyanogen, and 59.76 of potassium, it absorbs humidity and carbonic acid from the air, and becomes liquid, continually exhaling fumes of prussic acid. It easily dissolves in water, but very little in spirit of wine. The aqueous solution exhales, when in contact with the atmosphere, a strong smell of prussic acid: by the

reaction of the water, and carbonic acid of the atmosphere on the hydrate of potassa, carbonate of potassa and prussic acid are produced. By evaporation in vacuo, without the application of an increased temperature, it may be crystallized in more or less perfect octahedral crystals. These crystals contain neither hydrogen nor oxygen; and this proves that the name prussiate (or cyanate) of potassa can only be considered as referring to the process of its formation or decomposition. If the aqueous solution of cyanide of potassium be evaporated by the action of heat, decomposition, more or less complete, takes place, according to the length of time and the degree of heat employed for this purpose: ammonia and prussic acid are evolved, and the residue contains carbonate and formite of potassa, also a slight quantity of undecomposed cyanide of potassium. In the solutions of most of the heavy metals an aqueous solution of cyanide of potassium produces precipitates formed by the combination of the respective metals with cyanogen.

The action of cyanide of potassium may be inferred from its property of being easily decomposed into potassium and prussic acid when subjected to the influence of water and the weakest acids, giving out pure prussic acid. It is, however, not a very appropriate succedaneum for the latter as a remedy, because the very concentrated form in which it represents prussic acid renders the variation in contents of prussic acid produced, by its more or less advanced decomposition, of still greater consideration than those of the very dilute officinal prussic acid. Besides, this accurate division into small doses is almost impossible, as this substance deliquesces so very rapidly. We can therefore only caution practitioners against the use of this remedy; and support this caution by reminding them of the accidents already caused by its application. (See ANNALS, No. 14.)

A solution of cyanide of potassium in water, and digested with sulphur, takes up one-fourth of its own weight from the latter, which combines with the cyanogen, forming a ternary compound; the cyanide of sulphur and the solution then contain sulpho-cyanide of potassium (sulpho-cyanetum kalicum, kali anthrazothionicum). If the sulpho-cyanide of potassium be submitted to distillation in a proper apparatus, together with phosphoric acid, phosphate of potassa is produced, whilst the water is decomposed, and a colourless very acid liquor passes over. This acid has been termed sulpho-cyanic acid, and also, by contraction of the Greek names, Anthrazothionic acid (acidum sulphocyanicum or anthrazothionicum). It has a less poisonous effect than prussic acid, and is especially distinguished by its property of imparting a blood-red colour to neutral solutions of the peroxide of iron, even in a very dilute state, by generating sulpho cyanide of iron (sulpho-cyanate of peroxide of iron, sul-

pho-cyanetum ferricum). This preparation was formerly recommended for medical use by Th. V. Grotthuss, and the red colour of blood has been, although erroneously, ascribed to its presence. Sulpho-cyanide of potassium occurs in the saliva, as every one may easily ascertain by putting some saliva on a watch-glass, adding to it a drop of a very dilute solution of the oxide of iron, and stirring both together by means of a glass-rod. The mixture assumes a more or less red colour. In the saliva of a person under the influence of mercurial salivation no such reaction takes place.—*A Duflos's Pharmacol. Chimie.*

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ART. IV.—*Observations on the Volatile Oil of Gaultheria Procumbens, proving it to be a Hydracid analogous to Saliculous Acid.* By WILLIAM PROCTER, Jun.

SEVERAL years since the volatile oil of *Spiræa ulmaria* (meadow sweet), first obtained by Pagenstecher by distilling the flowers of that plant with water, was proved by Löwig to contain a hydracid, which possesses uncommon interest from the number of compounds it is capable of forming with other bodies. The discovery of hyduret of salicylic acid as a product of the decomposition of salicin, by Piria, and its identity with the hydracid in oil of *Spiræa ulmaria*, as since demonstrated by the exact analyses of Ettling\*, have added much more interest to these proximate principles.

The hypothetical radical called *spiroil* by Löwig, and *salicylic* by Piria, Liebig denominates *salicule*. This radical, combined with an equivalent of hydrogen, forms *saliculous acid*, which, united with bases, constitutes *saliculites*. When saliculous acid is oxidized by the agency of potassa, water, and heat, *salicylic acid* is formed, and its compounds are called *saliculates*. When saliculous acid combines with chlorine, bromine, or iodine, an equivalent of hydrogen is replaced by an equivalent of those elements respectively, and *chlorosalicylic*, *bromosalicylic*, and *iodosalicylic* acids are produced.

For several years past it has been supposed† that the volatile oil of the *Gaultheria procumbens*, either from the analogy of their odour or specific gravity, possessed similar properties with the oil of *Spiræa ulmaria*, without any step having been taken to ascertain the correctness of the supposition. The observations which follow are intended to throw light on this subject. The chymical characteristics of oil of *Gaultheria* have been found, in many instances, to accord with those described as peculiar to saliculous acid; yet several instances occur to the contrary. They have the same density, and the aqueous solution of each colours the persalts of iron purple. The compounds which

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\* Liebig's Turner.

† Dr. Wood, U. S. Dispensatory.

potassa, soda, and oxide of copper form with oil of gaultheria are very like the salts of saliculous acid with those bases.

The action of an excess of caustic potassa with heat produces a crystalline body, identical in all its reactions with saliculic acid, as described by Piria.

The compounds of oil of gaultheria and potassa, when exposed to the combined influence of moisture and the atmosphere, undergo a decomposition similar to that of saliculite of potassa.

The reactions of chlorine and bromine with oil of gaultheria yield compounds similar to those with saliculous acid; and nitric acid also produces results of an analogous character.

On the contrary, the boiling point of oil of gaultheria is many degrees higher than that of saliculous acid. Ammonia forms a compound with it which differs from saliculite of ammonia in not being decomposed by acids with the separation of the oil, nor by potassa with the separation of ammonia. All endeavours to form the body called *saliculimid* by Liebig, with the process he gives, were ineffectual. The compounds of baryta and lead with oil of gaultheria are *white*, while the saliculites of those bases are yellow. But the most striking difference between these substances is, that when oil of gaultheria is boiled with solution of potassa, it is not recoverable by means of an acid, as saliculous acid is. Under these circumstances a crystalline substance is precipitated, which is the same acid that results from heating the oil with an excess of potassa.

#### OIL OF GAULTHERIA PROCUMBENS.

This volatile oil is extensively used by the pharmacutists of this country to flavour syrups, &c. Most of the oil used in this city is obtained from distillers residing in New Jersey, in which State the plant yielding it grows in great abundance. As usually found in the shops, it has a more or less intense red colour; but when recently distilled, it is colourless, or nearly so. Its density, as the result of several careful observations, is 1.173, and its boiling point 412° F.; the mercury remaining stationary at that point. Its taste is burning and aromatic. It is slightly soluble in water, to which it communicates its odour and taste; and it mixes with alcohol and ether in all proportions.

An aqueous solution of the oil is coloured purple by the persalts of iron.

Dropped into a concentrated solution of potassa or soda, the oil is instantly solidified, becomes white, and separates from the alkaline solution while heat is disengaged.

Oil of gaultheria decomposes the carbonates of potassa and soda gradually without heat; but if gently warmed, the evaporation of carbonic acid is evident.

Chlorine and bromine, when brought into contact with oil of gaultheria, combine with it ; the mixture becomes very hot, and hydrochloric and hydrobromic acids are evolved. Iodine is dissolved by the oil forming a deep-red solution, without combining with it, as heat dissipates the iodine without the production of any hydriodic acid.

Nitric acid, of density 1.40, assisted by heat, converts oil of gaultheria into a crystalline substance having acid properties, whilst nitrous acid fumes are evolved. If fuming nitric acid be employed, the reaction is violent, without the assistance of heat, and a different production is obtained.

When oil of gaultheria is added to concentrated sulphuric acid, the latter becomes slightly coloured ; and if heated, the odour of the oil is destroyed.

When oil of gaultheria is distilled with solution of potassa in excess, the distilled liquid has neither the odour nor taste of the oil, and, consequently, its constitution differs from that of the oil of *Spiræa ulmaria*, which, under the same circumstances, yields a volatile oil distinct from saliculous acid, that acid remaining combined with the potassa.

#### OIL OF GAULTHERIA AND AMMONIA.

When oil of gaultheria is mixed with a concentrated solution of ammonia, and agitated, it is gradually dissolved, and the solution acquires a brownish colour. This solution, on being exposed to the air, deposits large brown-coloured crystals as the excess of ammonia evaporates. When these crystals are dissolved in boiling alcohol, the solution suffered to cool, and the crystals thus obtained again dissolved and crystallized, the compound is obtained in four-sided prisms, with dihedral terminations.

This substance is slightly soluble in cold water, and more so in boiling water, which deposits it in turfs on cooling. Alcohol and ether dissolve it readily ; but in solution of ammonia, it is more soluble than in any other menstruum ; from which it is precipitated by saturating the alkali with an acid. Solution of potassa dissolves it without separating ammonia, even when boiled. Sulphuric, nitric, and hydrochloric acids have no effect on it when cold. Hot sulphuric and hydrochloric acids dissolve it without decomposition ; and when diluted, the compound is precipitated ; but hot nitric acid decomposes it, nitrous acid vapours being evolved. When heated to 265° F. it fuses ; and a few degrees higher, it sublimes without residue, and condenses in crystalline scales with iridescent reflection, perfectly white and transparent, and possessing the same properties as before sublimation. When suddenly heated it boils, and is rapidly converted into vapour without any separation of ammonia. It



has no taste, and, if pure, no odour ; but in the form as first obtained, it has a weak aromatic smell.

A portion of this compound was kept moist in a close vessel for three weeks, without the slightest evidence of change. Neither acids nor alkalies, nor any other means which have been tried, will cause the isolation of the oil of gaultheria or ammonia from this substance.

#### OIL OF GAULTHERIA AND POTASSA.

When oil of gaultheria is added to a concentrated solution of potassa, instant combination takes place, and a crystalline substance results, which separates from the solution. Pressure between bibulous paper separates most of the adhering alkali ; and by solution in a small quantity of hot alcohol it is deposited in six-sided tables by cooling. These crystals are transparent, nearly colourless, and are very soluble in water, and soluble in alcohol and ether.

When dry, this salt is not affected by the air ; but if moisture be present, it becomes dark-coloured, and finally black. The acids decompose it, setting the oil at liberty. It is precipitated white by the salts of baryta, lead, and zinc ; yellow by nitrate of mercury ; gray by the nitrate of silver ; and bluish-gray by protosulphate of iron.

When an excess of oil of gaultheria is employed in crystallizing it from alcohol, the salt is obtained in acicular crystals, which decompose by solution in water, a portion of oil being liberated.

#### OIL OF GAULTHERIA AND SODA.

The reactions of these two substances are similar to those with potassa. The soda salt is perfectly white, crystallizes in minute prisms, and is much less soluble in water and alcohol than the preceding salt.

#### OIL OF GAULTHERIA WITH BARYTA.

When chloride of barium is added to a solution of either of the two last salts, a white flocculent precipitate results. If to a transparent solution of baryta in cold water, oil of gaultheria be added, and the mixture agitated, a white flocculent precipitate is also obtained. This, when washed with alcohol, and dried, is the salt of baryta. When it is mixed with water, acids decompose it, the oil being liberated. It is soluble in boiling water.

#### DECOMPOSITION OF THE ALKALINE SALTS OF OIL OF GAULTHERIA BY HEAT.

If protosulphate of iron be added to a cold solution of either the potassa or soda salts of oil of gaultheria, a bluish-gray pre-

precipitate is produced ; but when the solution is boiled for some time, and then tested, no precipitate ensues on the addition of the ferruginous salt, but a deep-red transparent solution results. By boiling a hot solution of the baryta salt, the same decomposition occurs. When an acid is added to either of the boiled solutions, a white crystalline precipitate is obtained, without a trace of the oil of gaultheria. This crystalline matter, when heated in a close vessel, sublimes without residue, and condenses in four-sided prisms, with obliquely truncated summits. When dissolved in hot water, its solution yields the fine purple colour with protosulphate of iron, so characteristic of the *acid* obtained by acting on oil of gaultheria with an excess of potassa and heat, as shown in the sequel, which has all the characters of salicylic acid.

#### OIL OF GAULTHERIA AND OXIDE OF LEAD.

When an excess of this oil is agitated for some time with hydrated oxide of lead suspended in water, combination takes place. By subsequently washing with alcohol, the compound is obtained free from adhering oil. It may also be obtained by adding acetate of lead to a solution of the potassa salt of oil of gaultheria. It is a light white powder. When mixed with water, and an acid is added, the oil separates, and floats on the surface of the liquid in minute globules.

#### OIL OF GAULTHERIA AND OXIDE OF COPPER.

When hydrated oxide of copper is agitated with an aqueous solution of oil of gaultheria, the mixture, from a blue, is changed to a grass-green colour, and the odour of the oil ceases to be perceptible. An excess of oil should be present to combine with all the oxide, and the precipitate washed with alcohol and dried. This compound has the form of a light-green powder. When heated, it is decomposed ; and if suspended in water, the contact of an acid causes the oil to separate.

#### OIL OF GAULTHERIA AND OXYGEN.

When oil of gaultheria is heated with an excess of potassa, the same reaction occurs as when salicylic acid is treated in the same way ; a gaseous matter (hydrogen) is evolved, and the whole becomes a crystalline mass on cooling, without a trace of the oil being perceptible. By dissolving this mass in water, and adding an excess of diluted hydrochloric acid, a white precipitate results, which consists of tufts of crystals resembling benzoic acid. By washing with cold, and dissolving with boiling water, the solution, on cooling, yields beautiful silky, four-sided prisms, with obliquely truncated summits.

This substance possesses the properties of an acid ; it is slightly

soluble in cold water, to which it communicates an acid reaction, and much more soluble in boiling water, alcohol, and ether. It fuses at 250° F.; and, when further heated, sublimes unchanged, condensing in long, very brilliant, four-sided needles, more regular than those obtained from water. The vapour of this acid excites coughing when inhaled; its taste is sweetish, like that of acetate of lead; and it irritates the fauces on swallowing. It decomposes the alkaline carbonates with effervescence, and forms with the salts of iron a fine purple solution. Nitric acid, sp. gr. 1.40, when cold, does not affect it; but if heat be applied, red fumes are evolved, and a yellow crystalline matter produced. Fuming nitric acid acts on this acid when cold.

When this acid is saturated with potassa, a white salt is obtained in feathery crystals, which is soluble in water, alcohol, and ether. It is precipitated by the soluble salts of lead and tin; but those of baryta, zinc, copper, magnesia, and iron, do not. The salt of soda is similar to that of potassa.

The ammoniated salt crystallizes in needles. When heated to 260° F. it fuses and sublimes in brilliant scales, having an iridescent reflection. Too much heat partially decomposes the salt, leaving a carbonaceous residue. It is soluble in water, and potass added to its solution separates ammonia.

When protosulphate of iron is added to a solution of either of the above salts, a deep-red colour is produced. When the persulphate is employed, the solution is purple.

If to a boiling solution of this acid an excess of carbonate of lead be added, carbonic acid is liberated, and, on filtering the hot solution, beautiful four-sided crystals of the lead salt are obtained.

With nitrate of silver, the soluble salts of this acid yield a white precipitate.

[To be continued.]

#### ART. V.—*Test for Manganese.*

PROFESSOR OTTO in his translation of Graham's Chymistry, has furnished the following remarks:—

The manifold applications of manganese and of the higher oxides of manganese in general, depending on the quantity of oxygen which they are able to furnish, render it necessary to have a means by which their value in this respect may be quickly and easily ascertained. The value of these oxides is in strict proportion to the quantity of chlorine which they evolve when treated with muriatic acid; and again, this chlorine may be calculated by the degree of oxidation to which a quantity of sulphate of iron may be reduced, when submitted to its action.

545.9 parts of pure peroxide of manganese are capable of evolving 442.6 parts of chlorine : and these are capable [by the decomposition of water] of transforming 345.6 parts of crystallised proto-sulphate of iron into the persulphate of iron. 50 grains of peroxide of manganese, therefore, furnish as much chlorine as is required for the higher oxidation of 317 grains (more precisely 316.5 grs.) of proto-sulphate of iron.

The test is, then, founded on the above calculation, executed in the following manner:—50 grs. of the pulverised manganese which is required to be tested, and 317 grs. of proto-sulphate of iron, are exactly weighed. The manganese is then put into a bottle for digestion, with about  $1\frac{1}{2}$  ounce of concentrated muriatic acid and  $\frac{1}{2}$  ounce of water. Portions of the weighed proto-sulphate of iron, at first in larger and afterwards in smaller doses, are then added, until a sample of the liquor (which must be slightly heated towards the end), taken out by means of a glass rod, just begins to produce a blue precipitate in a drop of a solution of red ferrocyanate of potassa, previously spread on a plate of porcelain ; and when at the same time no odour is further evolved therefrom, it is a proof that the sulphate of iron is contained therein in slight excess. The quantity of sulphate of iron consumed is then ascertained by weighing the residue, we will say that it may be 5. grains. If the manganese had been a pure peroxide, 317 grs. of sulphate of iron would have been consumed, and these would indicate, according to the preceding calculation, 100 per cent. of peroxide of manganese : if the manganese, however, consisted only partly of peroxide, it will have consumed a proportionately smaller quantity of sulphate of iron, from which the per centage of peroxide may be ascertained by the proportion :—

$$317 : 100 = v. x.$$

Suppose that 298 gr. of sulphate of iron had been consumed for the experiment, the manganese examined would contain only 94 per cent. of peroxide for—

$$317.100 = 298.94$$

Or, and this is the same thing, 100 parts of the examined manganese would contain the same quantity of applicable oxygen as there is contained in 94 parts of pure per-oxide. The number of consumed grains of sulphate of iron may, therefore, be ascertained in the corresponding number per cent., by multiplying the former with 0.315 ; in this case, therefore,  $298 \times 0.315$ . It is likewise easily calculated that the per centage of chlorine, which the examined manganese, if employed for practical use, is ascertained by multiplying the number of grains of the sulphate of iron consumed with 0.2588. The manganese under

question would, therefore, be able to yield  $298 \times 0.2586 = 76$  per cent. of chlorine.

For testing the manganese, sulphate of iron, precipitated by spirit of wine, as employed in chlorimetry, is best adapted.

It should be exposed to the air until it has entirely lost its alcoholic flavour. In case of the manganese being employed in a very finely pulverised state, the deoxidation and solution by the sulphate of iron ensues, even at a low temperature, rather rapidly; the coarser parts disappear easily when exposed to the influence of a higher temperature. The test does not require very strict attention, in consequence of the solution taking place. So long as the liquor appears still very black, by the manganese powder added to it, more sulphate of iron may be added without hesitation; as soon as the liquor commences to grow clearer, the addition of the salt must then be continued with greater care. The red ferrocyanate of potash should be free from any yellow ferrocyanide of potassium. The best kinds of manganese occurring in this country (Saxony), yield a ratio of only from 29 to 92 per cent. of per-oxide.—*Gewbebl. f. Sachsen.*

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#### ART. VI.—*Anhydrous Alcohol.*

NOELLE advises that, in preparing anhydrous alcohol by means of caustic lime, the mixture of 63 pounds of caustic lime, and of 48 quarts of alcohol of 80° Richter, might be left for one or two days in the apparatus closed for distillation previous to commencing the process of distillation. The six ounces which first pass over only are then somewhat dilute: all the rest is free from water. If the object be to avoid loss, the heat must be increased considerably towards the end, and the still-head kept covered with a wet cloth. Thirteen quarts and a half of alcohol, of 98 to 99°, are thus obtained from eighteen quarts of spirit of wine of 80°. The odour of lime is easily removed by rectification over charcoal powder and a little tartaric acid.—*Arch. d. Pharm.*

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#### ART. VII.—*Quinine in the Urine, Excrements, Perspiration, and Blood.*

LANDERER some time since proved that quinine may be detected in the perspiration and excrements. On further investigation he has recently discovered it whilst examining the urine of a person, not only in the liquid, but also, and chiefly, in the yellowish red sediment, consisting commonly of phosphate and urate of lime and carbonate of ammonia. He likewise examined the blood of two individuals suffering from intermittent fever, which blood had been taken to remove the inflammatory symptoms.

The serum of the blood was of a decidedly bitter taste, and when evaporated the residue was digested with acidulous water; the extract precipitated by ammonia, quinine was found therein.  
—B. R.

[What, then, becomes of Liebig's theory? (Organic Chymistry of Physiology, p. 187.)—ED. A. C.]

ART. VIII.—*On the Analysis of Oxgall, and the Characteristic Properties of its Elements.* By the Barón J. BERZELIUS.

[From the Kongl. Vet. Acad. Handl.]

[Continued from page 443.]

VEGETABLE acids do not produce a similar change in bilin, according to Demarçay. I did not make their action the object of my experiments, but I have observed that pure bilin becomes acidified if dissolved in water, and submitted to subsequent evaporation of this solution, and that it forms basic bilifellinate of lead, if mixed with oxide of lead previously washed. It is, therefore, probable, that these acids produce at least a similar effect with water.

A solution of bilin in water may be supersaturated, at a low temperature, with chlorine gas, without any perceptible action taking place; but, at the temperature of the water-bath, twofold decomposition ensues, the bilin evolving, in consequence of the influence of the chlorine, muriatic acid, and this muriatic acid transforming the parts not already destroyed into bilifellinic acid, taurin, &c.

Bilin combines both with acids and with alkalis; but all such combinations are soluble, and cannot be isolated from an excess of the one or the other component. We have, however, seen, in the preceding experiments, how the affinity of sulphuric acid for bilin may serve for disengaging a certain quantity of bilin from the bilifellinic acid, bilicholinic acid, &c. A combination with alkali is easier obtained, and more stable. The bilin of a concentrated solution, mixed with a strong solution of the hydrate of potassa or soda, is disengaged in a few moments in the form of a coherent magma, being a combination of the alkali with bilin. The alkali does not contain any part of it in solution, and may be decanted therefrom. The combination being quickly washed with water, in which, however, it easily dissolves, is of a caustic and bitter taste, and also dissolves easily in alkali. The alkali gradually absorbs carbonic acid, and disengages the bilin, with a slight quantity of potassa, which is not dissolved in the concentrated solution of carbonate of potassa. Bilin is not capable of expelling carbonic acid, and the carbonic acid disengages the bases with which the bilin may have been combined. Bilin, prepared in the above-described manner, frequently contains in the liquid state some oxide of lead in solution,

which causes it to grow turbid whilst filtering, arising from the carbonic acid of the air, and thus the whole contents of oxide of lead are deposited during evaporation.

Demarçay stated, that those components of gall which are soluble in pure alcohol, if a strong solution of hydrate of potassa is added at a boiling heat, are transformed into cholic acid, which combines with the alkali and ammonia which escapes; this process, however, requiring several days. As I found that the change by acids, mentioned by Demarçay, perfectly ensues with pure bilin, I supposed that it must likewise occur with alkali. Having, however, continued the boiling for three days, for eight hours every day, I obtained, after saturation of the alkali with muriatic acid, a very slight quantity of the ordinary acids of gall, besides those combined with precipitated bilin, and this proves that the bilin had been then destroyed; the acid liquid was concentrated without showing any trace of cholic acid being disengaged therefrom in a solid form. From the alcoholic extract of gall I was able, after long boiling with carbonate of potassa, to precipitate a somewhat considerable quantity of cholic acid, by supersaturating the alkali with acetic acid, by which the bilifellinic acid is not precipitated.

Bilin contains azote combined; evolves, when burnt, a strong odour of ammonia; and burns with some difficulty, and with a bright, sooty flame, without leaving any residue of ashes, if pure.

The bilin prepared in the above-mentioned way, yields, if the analysis has been conducted in such a manner that the bases are previously disengaged, a small, and, in general, a very slight quantity of a pasty mass, containing lead insoluble in pure alcohol, which perhaps may consist of the oxide of bilin, with lead. If this mass appears it must not be washed, because the alcohol by itself dissolves it partly, and the passed solution then grows turbid.

If bilin is extracted from gall containing cholic acid, the bilin is obtained mixed with another substance, which pure alcohol does not dissolve, but of which it dissolves a good deal in combination with bilin, which, however, is less soluble in pure alcohol than in alcohol containing water, and which may therefore be washed. Those parts which are dissolved in alcohol with the aid of bilin are again precipitated by a plentiful addition of anhydrous alcohol. The precipitate sinks slowly to the bottom, forming a white powder, which attaches to the inside of the glass in the form of semi-crystalline grains.

This substance dissolves rather slowly in water\*; easier in alcohol of 0.84; and remains, after spontaneous evaporation, in the form of a transparent mass, which is perfectly neutral, and

\* Leaving behind some carbonate of oxide of lead, precipitated from the oxide of bilin, with lead.

of a sweetish bitter taste, resembling bilin very much. It bears a close resemblance to a modification of bilin. Burnt on platina foil it leaves behind alkaline ashes, not containing any chlorine, and soluble in water. It is, therefore, a soda salt. After dissolving it with alcohol of 0.84, and adding one drop of sulphuric acid to the solution, sulphate of soda is precipitated, and an acid solution in alcohol left, which, on spontaneous evaporation, retains drops of free sulphuric acid, together with an organic acid, from which the sulphuric acid may be washed out by means of a little water. The nature of this acid cannot, then, be easily ascertained, for it is cholic acid, changed by the residue of bilin, into bilicholinic acid; if, however, this soda salt is evaporated by the aid of heat, it is disengaged in the form of concentric crystalline globules, and the solution is finally covered with a soft crystalline film of extremely fine microscopic crystals, interwoven with each other; a property by which the presence of cholate of soda is ascertained, as well as by the circumstance that the salt, after spontaneous evaporation, is of a gummy appearance. It also contained a little stearic acid or margarate of soda, (qu. fellinic acid ?)

[To be continued.]

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## CHEMISTRY APPLIED TO AGRICULTURE.

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ART. IX.—*On the Sulphur contained in Plants.* By A. VOGEL.

THAT many plants contain traces of sulphur has been satisfactorily proved by Planche Creutzburg, and many other eminent chymists. Among the number of those plants which are chiefly known as containing sulphur, the garden cress may be particularly adduced.

There can be no doubt that these plants are capable of decomposing the sulphuric acid contained in the saline sulphurets of the soil, so as to take therefrom the sulphur. Vogel, however, sowed seeds in a soil which contained neither free sulphur nor saline sulphate; and, notwithstanding this, these plants contained a considerable quantity of sulphur.

The soil consisted of a coarse powder of white glass. Before it had been put into the vessel the glass had been strongly heated, but not to the point of fusion, and then washed with a considerable quantity of water, which, however, did not take therefrom any sulphates. Vogel sowed in this soil cress seeds, and kept the soil moist with distilled water. When the young plants had attained the height of some inches, they were extracted, together with the roots; the white roots were then cut off, and, after being washed, quickly dried, together with the plants. Both were then exposed to the action of heat in a retort; and it



now appeared that not only the green leaves and stalks, but likewise the white roots, contained a considerable quantity of sulphur. This was indeed the case with the seeds employed; but the quantity of sulphur contained in the plants is much more considerable than that contained in the seeds.

The juice pressed from the plants of cress grown on powdered glass, as previously described, also contained saline sulphates in considerable quantity.

Vogel also caused some cress seeds to vegetate in coarsely ground quartz, and in pulverized flint glass, and also in fine and well-washed silica previously disengaged from fluosilicic acid by means of water. (The vegetation proceeded much slower in the last than in the two first). The plants grown in a soil of this description always contained sulphur and saline sulphates.

In order to fix approximatively the quantity of sulphur contained in the seeds of cress, as well as in the plants grown therefrom, Vogel further undertook the following experiments:—100 grains of cress seeds were heated gradually in a retort to a red heat, and the gases which meanwhile formed received in a ley of potassa. To this ley acetate of lead was then added, until no further precipitation ensued. The brown precipitate thus produced, after being well washed, was found to consist of hydrated oxide of lead, together with carbonate of lead, and of black sulphuret of lead. The two former were dissolved in dilute and boiling nitric acid, and a quantity of sulphuret of lead was then left behind, which, after being washed with a good deal of water, and then dried, weighs 0.95 grains, corresponding to 0.129 of sulphur.

In order to obtain in like manner a quantitative estimation of the sulphur contained in the cress plants, Vogel then submitted a number of plants grown from 100 grains of seeds to another examination. They weighed after being dried 2040 grains, which, treated in the same manner as the seeds, yielded 15.1 grains of sulphuret of lead, corresponding to 2.03 grains of sulphur.

How this surplus of sulphur may have been introduced into the plants, the writer has in vain endeavoured to explain.—*Journal f. pr. Chimie.*

#### ART. X.—*Products of the Oxidation of Gluten.*

PERSOZ distilled gluten with sulphuric acid and chromate of potassa, and obtained as products, first, carbonic acid, and afterwards prussic acid. The residue contained chromate, alum, and sulphate of ammonia; it seems, therefore, that gluten yields, by oxidation, nothing but carbonic and cyanic acids and ammonia.—*Comptes Rend.*

## PRACTICAL PHARMACY.

ART. XI.—*Iodide of Zinc.*

**Synonymes.**—Zincum iodatum, iodetum s. ioduretum zincicum, zincum hydroiodicum s. iodhydricum, or ioduret ou hydriodate de zinc, is obtained by digesting at a moderate temperature, in a porcelain vessel, 2 parts of iodine, 1 part of granulated zinc, and 4 parts of water, stirring frequently with a glass, porcelain, or zinc rod, till all the colour of iodine has disappeared. The whole is then left in mutual contact for twenty-four hours, filtered, and the evaporation of the filtered liquid continued over a quick fire, until a portion of it placed on cold porcelain immediately solidifies\*. Zincum iodatum is tested by pouring a few drops of nitric acid on a small quantity of it contained in a porcelain crucible, and heating over the spirit-lamp to redness, when violet fumes of iodine are evolved, and there is finally left behind a yellow oxide of zinc, whose colour disappears on cooling. Its purity is ascertained by its perfect solubility in carbonate of ammonia, and the pure white cloudiness caused in this solution by sulphuretted hydrogen water.

Iodide of zinc has been recommended by Poulet against scrofulous inflammation of the eyes in the form of collyrium, in the proportion of fifteen grains to six ounces of water; and by Ure in the form of an ointment, as an antistrumatic (one drachm to one ounce of lard): one drachm to be rubbed on the swelling once or twice a day.—*Duflos.*

ART. XII.—*Calomel in a fine State of Division.*

IN that very admirably conducted work, the *Journal de Pharmacie*, for December, the talented Soubeiran, who has for a length of time been engaged in experiments in reference to calomel, with a view to compete with the beautiful preparation of the English manufacturer, has at last succeeded in arriving at a satisfactory result. In fine, he has discovered the English method. M. Soubeiran was led by analogy to pursue the system adopted for procuring flowers of sulphur; that is, by subliming the calomel into a large chamber, wherein, the product, gradually cooled in the air of the chamber, falls down in an extreme state of division. The cucurbit may then consist simply of a vessel resembling a large tube, into which, having introduced the sulphate of mercury and chloride of sodium, the mouth is directed into the adjoining chamber, and the fire set on. It will be observed here that M.

\* The zincum iodatum thus obtained forms a white silvery mass quickly liquefying in the air, which dissolves in water and spirit of wine into a whitish and turbid liquid of a highly unpleasant and styptic taste.

Soubeiran avails himself of the atmospheric air as a means of division. We believe the non-success of Dr. A. T. Thomson's patent for manufacturing sublimate, which process consists in (may we be allowed the term?) "burning mercury in chlorine gas," arises from this very fine state of division, rendering his product unmarketable, the trade having been so long accustomed to masses, rather than the acicular crystals of Dr. A. T. Thomson's process. Perhaps, by a sublimation into atmosphere of very rarefied air, or heated steam, the patentee taking a hint as by adopting a principle the converse of M. Soubeiran, may conciliate the fashion which exists, even in reference to corrosive sublimate.

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ART. XIII.—*Unguentum Hydrargyri Nitratis.*

*To the Editors of the Annals of Chymistry and Pharmacy.*

GENTLEMEN—As a subscriber to your valuable publication, and as I find your pages are open to humble contributors like myself, I have ventured to send you the following formula for *soft* "Unguentum Hydrargyri Nitratis;" which I can recommend from experience:—

R. Hydrarg. purif. (pondere) 3i; Acid. Nitric. f3xl.; Ol. Palmæ 3iss.; Ol. Amygdal. Dulc. (pondere) 3viiss. Fiat S. A.

G. E. BAYLEY.

Bridge-street, Andover, Jan. 14th, 1843.

[We insert the preceding formula, not with a view to its general introduction, but as affording, perhaps, a hint in the solution of this *questio vexata*, being, of course, inadmissible except for the private practitioner.]

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ART. XIV.—*On the Combinations of Iron with Iodine.*

*To the Editors of the Annals of Chymistry and Pharmacy.*

GENTLEMEN,—As you have done me the honour of publishing my former remarks on the Sesquioxide of Iron (pp. 287—9), I take the liberty of forwarding you the result of my experiments with these substances for insertion in your very useful journal.—Your obedient servant,

WILLIAM PROCTOR.

St. Nicholas' Church Yard, Newcastle,  
January 12, 1843.

At the Pharmaceutical meeting of July 7, 1841, a paper was read on the preparation of Iodide of Iron, by Dr. A. T. Thomson, and published in their Transactions, vol. i. p. 44, in which he says, "Daily experience has demonstrated, that the solid salt cannot be preserved long even in well-stoppered bottles; and when the evaporation has been conducted with the aid of lime, and carried to the greatest point of dryness, as proposed by Messrs. T. and A. Smith, chymists, Edinburgh, whose process has been adopted in the Edinburgh Pharmacopœia, the salt is still susceptible of

rapid decomposition. It is a mistake, however, to suppose, as Messrs. Smith have done, that the result of this decomposition is a peroxide and a periodide of iron; on the contrary, it is a mixture of iodide of iron, sesquioxide of iron, and free iodine. This is rendered obvious by throwing the decomposed mass into water; the sesquioxide falls to the bottom, whilst the solution, which contains the iodide, has the deep brown colour of the aqueous solution of iodine, and a powerful odour of that substance: it instantly, also, forms the iodide of amidine, when it is added to a cold solution of starch. Unfortunately, it has too often been dispensed in this state; and, consequently, it has been productive of much injury in cases in which the iodide of iron was clearly indicated, but in which the free iodine, in the decomposed preparation, was likely to prove hurtful." In a foot-note (p. 47), he adds, "In the *Journ. de Pharmacie* for Sept. 1840, we find a proposition by M. Oberdoerffer, a pharmacopolist at Hamburgh, to substitute a sesquioxide of iron for the iodide. He proposes to prepare it in the following manner:—Take sixteen parts of iodine, six parts of iron filings, and thirty-two parts of water; and form the iodide of iron. Filter the solution; and, having diluted it with 128 parts of water, add six parts of iodine and as much pure water as will make the whole up to 320 parts. M. Oberdoerffer remarks, that it produces the same effect as the iodine of iron, but it is more active. It is scarcely necessary to say, that this is not a sesquioxide, but a mixture of the iodide and free iodine. It is the presence of the latter that the syrup (of iodide of iron) is intended to prevent.—T."

How far Dr. Thomson is correct in his views your readers may judge from the experiments that follow; I shall only remark here, that in the *Medical Gazette*, vol. xxviii. p. 511, the proportion of iodine is eight parts to be added to the solution of proto-iodide so prepared. The *Chemist*, vol. i. p. 351, contains a quotation (from the *Zeitschrift für die gesammte Medicin*, No. 14, 1840) for Dr. Oberdoerffer's preparation, in which the latter proportion of iodine agrees with that stated in the *Gazette*, i. e. half the quantity contained in the original solution—the quantity, according to theory, requisite for converting the proto-iodide into per- or sesqui-iodide, should such a compound exist.

Mr. H. Scholefield, in the same volume (p. 520, et seq.), in a paper on the iodide of iron, after giving an analysis of commercial iodide of iron, observes, "thus the iodide of iron used in dispensing prescriptions is necessarily an indefinite preparation; and when it contains free iodine, as it generally does, its employment in medicine is rendered in many cases prejudicial."

Professor Rose, in his *Manual of Analytical Chemistry*, (Griffin's translation, part i. p. 197,) in describing the detection of iodine in iodides, goes on to say, "Hereby it is to be remarked, that it is free iodine alone which produces a blue colour with starch; and that, when iodine is combined with hydrogen or with a metal, it possesses no such property."

These views, I believe, are generally popular in chymical works.

As I was induced to think, from the results of my last experiments, that sesquioxide of iron existed, and did colour starch, my object was first to procure a solution of protoiodide, and to dissolve in it the proportion of iodine sufficient to form a persalt. I shall relate the experiments as they took place, leaving your readers to form their own opinions.

A. Twenty grains of iodine and the same quantity of iron filings were

put into a phial, and thirty drops of water poured on them. After combination had taken place,—which may be known when the liquid, which is first a deep reddish brown (*sesquiodide*?) becomes pale,—two ounces of distilled water, rather warm, were mixed with it. After the oxide of iron formed had subsided, the fluid was filtered. It had a tinge of green. No action on starch, but reddened litmus paper slightly.

B. One ounce of the above solution dissolved in five grains of iodine became a dark reddish brown colour, reddened litmus, and acted very powerfully on starch.

The following table represents the re-action of tests:—

| <i>Tests.</i>                  | <i>Solut. A.</i>                                                                                                        | <i>Solut. B.</i>                                                                                                                                                             |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Caustic potash . . . . .       | Pale green precipitate . .                                                                                              | Orange red precipitate.                                                                                                                                                      |
| Yellow prussiate of potash . . | Pale blue. . . . .                                                                                                      | Deep blue.                                                                                                                                                                   |
| Red prussiate of potash . .    | { An immediate blue precipitate, supernatant liquid, colourless.                                                        | { Turns very dark, but no precipitate in dilute solutions.                                                                                                                   |
| Sulphocyanide of potassium     | { No action. When treated with acetate of lead or potash, and dilute sulphuric acid, this liquid was slightly reddened. | { No action. When the iodine was removed by acetate of lead, the liquid, tested with the sulphocyanide, gave the characteristic colour of persalt of iron, a deep blood red. |
| Infusion of galls . . . . .    | No action . . . . .                                                                                                     | { Blackened. This effect may be more readily produced by first throwing down the oxide with potash, taking it up with diluted sulphuric acid, and instantly adding the test. |

The actions of tests on the solution A. determine a state not exactly according with the proto-salts;—the reddening of litmus, and change of colour on treating the solution with potash, acid, and sulphocyanide of potassium, a small portion of persalt in a state of combination or mixture with the proto-salt.

To endeavour to obtain a purer proto-iodide, the solution was diluted with an equal quantity of distilled water, and boiled with excess of filings of iron wire, and kept a few days with iron wire immersed in it; but, notwithstanding, sulphocyanide of potassium reddened the solution so treated.

The re-actions of tests on solution B. would lead me to suppose, that, as they correspond to those of the persalts of iron, the solution contained sesqui-iodide. If the iodine is not combined, we might expect that the potash would decolorize the fluid, and be converted into iodate and hydriodate of potash; while, by continued addition, the oxide would be thrown down, as in A. The iron, however, is precipitated in a higher degree of oxidation\*; and the liquid, on the addition of dilute sulphuric acid, does not produce any change of colour, as it would do, by setting free iodine at liberty, were iodate and hydriodate of potash present, even

\* This preparation of iodide of iron, with an addition of nearly half the quantity of iodine it contains, might, I think, be economically substituted for the iodide in preparing the iodide of potassium; the re-action in one case being,  $2\text{FeI} + 2\text{KO}$ , forming  $2\text{KI}$  and  $2\text{FeO}$ ; the other,  $2\text{Fe 3 I} + 3\text{KO}$ , becoming  $3\text{KI}$  and  $2\text{Fe 3 O}$ .

in small quantities. This precipitate, redissolved by diluted sulphuric acid, gives a very distinct deep blue precipitate with yellow prussiate of potash.

When this solution was decolorized by starch, it acted precisely as solution A. towards re-agents.

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## GALVANISM AND ELECTRICITY.

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### ART. XV.—*On the Durability of Photographic Impressions.*

By M. ULEX, of Hamburg.

[For the Annals of Chymistry and Practical Pharmacy.]

IMMEDIATELY after the great fire at Hamburg, M. Biow, a skilful artist, took daguerreotypes of all the interesting points of those destroyed parts of the town, which have an historical value for the Hamburger especially, as the ruins and the remains of the walls left standing were, soon after this event, ordered to be removed. The Historical Society, whose lively zeal in reference to any objects which may be valuable and interesting in connection with the history of our city, endeavoured to obtain possession of the whole of these forty-six photographic impressions. The transaction would probably have been terminated, by the purchase of them for the collection of the Society, had not one of its members started the doubt as to the durability of these impressions. Might not these productions of the sun's rays, he observed, be also gradually destroyed by the action of light; and another generation, eager to form an idea of the destruction occurring at a former period, and reverting to these impressions, discover, with disappointment and dismay, that such impressions, once the true picture of a painful reality, with the most distinct and circumscribed outlines, had been converted into some dozens of mere unsightly metal plates, covered with black oxide.

On M. W., professor of chymistry at this place, being asked for his opinion, he readily confirmed the supposition of the first speaker by presuming that the impressions might be very easily and readily destroyed. If we consider, said he, that the substances employed for the production of the photographic impressions unite so as to form very weak combinations, which may as easily undergo entire decomposition; if we further consider that the quicksilver, which serves for producing these impressions, may become the cause of their ultimate destruction by the amalgamation thereof with the silver plate, and thus obliterate the outlines, and render them indistinct; if we finally consider, that a polished plate of silver is in a short time blackened by the sulphuretted hydrogen gas contained in the atmosphere, and that, after all, a photographic impression must be considered as ex-

posed to precisely the same influence and change, we must from all these reasons draw the inference, that these impressions are in the highest degree perishable.

The Society, thus discouraged, decided against the purchase of the impressions.

As I did not feel perfectly convinced by the reasons adduced by Professor W., I undertook a series of experiments with the daguerreotypes themselves, in order to ascertain the truth. For the purpose of ascertaining the manner in which they would be affected by light, I covered one half of one of these impressions with paper, and hung it up, so as to afford a direct southern aspect, thus exposing it for weeks to the continued action of the sun's rays. When, after this time, the protecting cover was removed, not the slightest difference could be perceived in the two several halves of the impression.

The same impression was then exposed, in the water-bath, to a temperature of  $+ 60^{\circ} \text{R.} = 167^{\circ} \text{F.}$ , without, however, its undergoing, in this instance, the slightest alteration.

If we examine a good photographic impression under the magnifying influence of the microscope, we are unable to distinguish any perceptible globules of quicksilver; the plate appears punctuated or dotted like a chalk drawing. That no destructive influence is to be feared from the quicksilver is still better proved by the following experiment:—

If we put some quicksilver into a bottle, and close the latter with a cork, on the underside of which we have previously attached some leaf-gold, the yellow colour of the latter will change, in the space of a few days, into white, merely by the action of the fumes of quicksilver, which are evolved from this metal even at ordinary temperatures. If, however, a silver plate be coated with some leaf-gold, and then brought into the apparatus for fumigation with quicksilver, and this is then heated to  $60^{\circ} \text{R.} = 167^{\circ} \text{F.}$ , and the plate left therein for the space of time (ten minutes) during which the plates are commonly left therein for the purpose of yielding a good impression, the gold will still preserve its golden yellow colour; and this proves how exceedingly slight the quantity of quicksilver fumes must be which are deposited on the plates.

It was ascertained, a very short time ago, that an iodized silver plate taken from the camera obscura, and placed for two hours over quicksilver of not more than  $10^{\circ} \text{R.} = 54^{\circ} \text{F.}$  (or even for only fifteen minutes in vacuo) yields a perfect and distinct impression. The quicksilver, therefore, would not be able to destroy the impressions. Other impressions were then exposed to steam, to the action of carbonic acid, ammonia, and even for some time to the action of sulphuretted hydrogen gas, and to the gas of hydrosulphate of ammonia, without, however, the impres-

sions losing in the slightest degree the distinctness of their outlines, or being destroyed. A pure silver plate in contact with the air, if only for a short time exposed, is, as is well known, rapidly blackened by the action of sulphuretted hydrogen. If however, the oxygen of the air be excluded, silver, with a perfectly clean surface, may be kept in sulphuretted hydrogen until it begins to be decomposed, without the former being at all affected. If a wide vessel is half filled with sulphuretted hydrogen, and then a daguerreotype impression immediately placed over it, this appears brown after the lapse of twenty-four hours, assuming a tinge of sepia, which, however, does not at all injure the distinctness of the impression: that this should be destroyed, or uniformly blackened, is quite out of the question. In the manner, however, in which these impressions are generally kept, that is to say, between paste-board and glass, both pasted together, not even the slightest tinge of brown will be produced by the presence of sulphuretted hydrogen. If a photographic impression is completely rubbed away by means of a piece of leather and rotten-stone, so that the bright surface of the silver alone is apparent, and the silver plate is then heated, the impression will reappear distinctly with all its outlines. This experiment serves likewise as an additional confirmation of the statements given by Moser. At the present time the photographic impressions are, almost without exception, gilt, according to the method introduced by Fisot. The previous statements find their application in the case of an impression treated in this manner to a still higher degree, the gold coating defies all noxious influences; whilst on former impressions the design appeared to lay like dust on the plate, and could be wiped off like the coloured dust on the wings of a butterfly; but now, by means of the gold coating, it is strongly fixed, and the impression, if friction be applied with the finger, does not diminish in distinctness in the slightest degree.

We arrive, then, at this result; that the preference, as regards durability, must justly be given to photographic impressions over paintings in oil, and we may confidently discharge the fear that they will soon undergo destruction. It is frequently the case that substances which are subjected to easy decomposition enter into very stable combinations, as proved by the influence of prussic acid and oxide of quicksilver, which alone decompose very easily indeed, whilst in combination they may produce the cyanide of quicksilver, which may be heated with sulphuric and nitric acids without being affected.

The impression used for the above described experiments were from the studio of MM. Stelzner and Biow, who produce photographic impressions of a beauty and size quite equal to the best specimens from Vienna and Paris; some, indeed, surpass them.



| NOMINA.                                  | FORMULÆ.                                              |
|------------------------------------------|-------------------------------------------------------|
| <i>Carbonas Zincicus</i> . . . . .       | $\text{Zn } \ddot{\text{C}}$ . . . . .                |
| — <i>Zirconicus</i> . . . . .            | $\ddot{\text{Zr}}_2 \ddot{\text{C}}^2$ . . . . .      |
|                                          | $\frac{1}{2}$ . . . . .                               |
| <i>Carbonicum</i> . . . . .              | $\text{C}$ . . . . .                                  |
|                                          | $\text{C}_2$ . . . . .                                |
|                                          | $\text{C}^2$ . . . . .                                |
|                                          | $\text{C}^4$ . . . . .                                |
| <i>tri Carburetum Ferri</i> . . . . .    | $\text{Fe } \text{C}^3$ . . . . .                     |
| <i>quadri Carburetum Ferri</i> . . . . . | $\text{Fe } \text{C}^4$ . . . . .                     |
| <i>Carburetum Hydricum</i> . . . . .     | $\text{H}^4 \text{C} = \text{H}_2 \text{C}$ . . . . . |
| <i>bi Carburetum Hydricum</i> . . . . .  | $\text{H}^2 \text{C} = \text{H}_2 \text{C}$ . . . . . |
| <i>Cerium</i> . . . . .                  | $\text{Ce}$ . . . . .                                 |
|                                          | $\text{Ce}_2$ . . . . .                               |
| <i>Chlor</i> . . . . .                   | $\text{Cl}$ . . . . .                                 |
|                                          | $\text{Cl}_2$ . . . . .                               |
|                                          | $\text{Cl}^2$ . . . . .                               |
|                                          | $\text{Cl}_2^2$ . . . . .                             |
|                                          | $\text{Cl}_2^3$ . . . . .                             |
|                                          | $\text{Cl}_2^4$ . . . . .                             |
|                                          | $\text{Cl}_2^5$ . . . . .                             |
|                                          | $\text{Cl}_2^6$ . . . . .                             |
| <i>Chloras Aluminicus</i> . . . . .      | $\ddot{\text{Al}}_2 \ddot{\text{Cl}}_2$ . . . . .     |
|                                          | $\frac{1}{2}$ . . . . .                               |
| — <i>Ammonicus</i> . . . . .             | $\text{N}_2 \text{H}_2 \ddot{\text{Cl}}_2$ . . . . .  |
| — <i>Argenticus</i> . . . . .            | $\ddot{\text{Ag}} \ddot{\text{Cl}}_2$ . . . . .       |
| — <i>Baryticus</i> . . . . .             | $\ddot{\text{Ba}} \ddot{\text{Cl}}_2$ . . . . .       |
| — <i>Bismuthicus</i> . . . . .           | $\text{Bi } \ddot{\text{C}}_2$ . . . . .              |

| PONDERA ATOMORUM. |                    | PARTES CENTESIMALES. |       |                      |
|-------------------|--------------------|----------------------|-------|----------------------|
| O = 100           | H <sub>2</sub> = 1 | + E                  | — E   | H vel H <sub>2</sub> |
| 779,06            | 62,48              | 64,54                | 35,46 |                      |
| 1969,71           | 157,84             | 57,90                | 42,10 |                      |
| 656,57            | 52,61              |                      |       |                      |
| 76,44             | 6,13               |                      |       |                      |
| 152,88            | 12,25              |                      |       |                      |
| 222,31            | 18,38              |                      |       |                      |
| 305,75            | 24,50              | 59,66                | 40,34 |                      |
| 568,52            | 45,56              | 52,59                | 47,41 |                      |
| 644,06            | 51,68              | 24,62                | 75,38 |                      |
| 191,40            | 8,13               | 14,04                | 85,96 |                      |
| 88,92             | 7,13               |                      |       |                      |
| 574,70            | 46,05              |                      |       |                      |
| 1149,89           | 92,10              |                      |       |                      |
| 221,33            | 17,74              |                      |       |                      |
| 442,65            | 35,47              |                      |       |                      |
| 663,98            | 53,21              |                      |       |                      |
| 885,30            | 70,94              |                      |       |                      |
| 1327,95           | 106,41             |                      |       |                      |
| 1770,61           | 141,88             |                      |       |                      |
| 2213,26           | 177,35             |                      |       |                      |
| 2655,91           | 212,82             |                      |       |                      |
| 3470,29           | 278,07             | 18,51                | 81,49 |                      |
| 1156,76           | 92,69              |                      |       |                      |
| 1269,61           | 101,74             | 25,75                | 74,25 |                      |
| 2394,26           | 191,85             | 60,63                | 39,37 |                      |
| 1899,53           | 152,21             | 50,37                | 49,63 |                      |
| 1929,57           | 154,62             | 51,15                | 48,85 |                      |

| NOMINA.                          | FORMULÆ.                                         |
|----------------------------------|--------------------------------------------------|
| <i>Chloras</i> Cadmicus. . . . . | $\dot{\text{Cd}} \ddot{\text{Cl}}_2$ . . . . .   |
| — Calceicus : . . . . .          | $\dot{\text{Ca}} \ddot{\text{Cl}}_2$ . . . . .   |
| — Cericus . . . . .              | $\ddot{\text{Ce}}, \ddot{\text{Cl}}_3$ . . . . . |
|                                  | $\frac{1}{2}$ . . . . .                          |
| — Cerosus . . . . .              | $\ddot{\text{Ce}} \ddot{\text{Cl}}_2$ . . . . .  |
| — Chromicus . . . . .            | $\ddot{\text{Cr}}, \ddot{\text{Cl}}_3$ . . . . . |
|                                  | $\frac{1}{2}$ . . . . .                          |
| — Cobalticus . . . . .           | $\dot{\text{Co}} \ddot{\text{Cl}}_2$ . . . . .   |
| — Cupricus . . . . .             | $\dot{\text{Cu}} \ddot{\text{Cl}}_2$ . . . . .   |
| — Cuprosus . . . . .             | $\dot{\text{Cu}}, \ddot{\text{Cl}}_2$ . . . . .  |
| — Ferricus . . . . .             | $\ddot{\text{Fe}}, \ddot{\text{Cl}}_3$ . . . . . |
|                                  | $\frac{1}{2}$ . . . . .                          |
| — Ferrosus . . . . .             | $\ddot{\text{Fe}} \ddot{\text{Cl}}_2$ . . . . .  |
| — Glucinius : . . . . .          | $\ddot{\text{G}}, \ddot{\text{Cl}}_3$ . . . . .  |
|                                  | $\frac{1}{2}$ . . . . .                          |
| — Hydrargyricus . . . . .        | $\dot{\text{Hg}} \ddot{\text{Cl}}_2$ . . . . .   |
| — Hydrargyrosus . . . . .        | $\dot{\text{Hg}}, \ddot{\text{Cl}}_2$ . . . . .  |
| — Kalicus . . . . .              | $\dot{\text{K}} \ddot{\text{Cl}}_2$ . . . . .    |
| — Lithicus . . . . .             | $\dot{\text{L}} \ddot{\text{Cl}}_2$ . . . . .    |
| — Magnesicus . . . . .           | $\dot{\text{Mg}} \ddot{\text{Cl}}_2$ . . . . .   |
| — Manganosus . . . . .           | $\dot{\text{Mn}} \ddot{\text{Cl}}_2$ . . . . .   |
| — Molybdicus . . . . .           | $\dot{\text{Mo}} \ddot{\text{Cl}}_3$ . . . . .   |
|                                  | $\frac{1}{2}$ . . . . .                          |
| — Molybdosus . . . . .           | $\dot{\text{Mo}} \ddot{\text{Cl}}_2$ . . . . .   |
| — Natricus . . . . .             | $\dot{\text{Na}} \ddot{\text{Cl}}_2$ . . . . .   |
| — Niccolicus . . . . .           | $\dot{\text{Ni}} \ddot{\text{Cl}}_2$ . . . . .   |
| — Palladosus . . . . .           | $\dot{\text{Pd}} \ddot{\text{Cl}}_2$ . . . . .   |

| PONDERA ATOMORUM. |                    | PARTES CENTESIMALES. |       |                      |
|-------------------|--------------------|----------------------|-------|----------------------|
| O = 100           | H <sub>2</sub> = 1 | + E                  | — E   | H vel H <sub>2</sub> |
| 1789,42           | 189,38             | 45,81                | 54,19 |                      |
| 1298,67           | 104,06             | 27,41                | 72,59 |                      |
| 4277,35           | 342,75             | 33,89                | 66,11 |                      |
| 1425,78           | 114,25             |                      |       |                      |
| 1617,35           | 129,60             | 41,72                | 58,28 |                      |
| 3831,59           | 307,03             | 26,19                | 73,81 |                      |
| 1277,19           | 102,34             |                      |       |                      |
| 1411,64           | 113,12             | 33,22                | 66,78 |                      |
| 1438,35           | 115,26             | 34,46                | 65,54 |                      |
| 1834,04           | 146,96             | 48,60                | 51,40 |                      |
| 3806,36           | 305,01             | 25,70                | 74,30 |                      |
| 1268,79           | 101,67             |                      |       |                      |
| 1381,86           | 110,73             | 31,78                | 68,22 |                      |
| 3790,48           | 303,73             | 25,39                | 74,61 |                      |
| 1263,49           | 101,25             |                      |       |                      |
| 2308,48           | 184,98             | 59,17                | 40,83 |                      |
| 3574,30           | 286,41             | 73,63                | 26,37 |                      |
| 1532,57           | 122,81             | 38,49                | 61,51 |                      |
| 1122,98           | 89,99              | 16,06                | 83,94 |                      |
| 1201,00           | 96,24              | 21,51                | 78,49 |                      |
| 1388,54           | 111,27             | 32,11                | 67,89 |                      |
| 2683,32           | 215,06             | 29,75                | 70,25 |                      |
| 1341,91           | 107,53             |                      |       |                      |
| 1641,17           | 131,51             | 42,56                | 57,44 |                      |
| 1333,55           | 106,86             | 29,31                | 70,69 |                      |
| 1412,33           | 113,17             | 33,25                | 66,75 |                      |
| 1708,55           | 136,91             | 44,83                | 55,17 |                      |

ART. XVI.—*Substitute for Glazed Frames in Hot-Beds.*

IN the *Rheinländische Gartenzeitung* is described a substitute for the glazed frames of hot-beds and green-houses, which deserves the attention of florists. Instead of glass the frames are covered with a fine white cloth of cotton. In order to render this more transparent, and enable it to resist moisture, it is covered with a preparation, the ingredients of which are four ounces of pulverized dry white cheese, two ounces of white slack lime, and four ounces of boiled linseed oil. These three ingredients having been mixed with each other, four ounces of the white of eggs, and as much of the yolk, are added, and the mixture is then made liquid by heating. The oil combines easily with the other ingredients, and the varnish remains pliable and quite transparent. The expense of a forcing bed arranged in this manner is inconsiderable, and it yields at the same time many other advantages. Such a hot-bed needs not the anxious attention required by the ordinary ones covered with glazed frames. During the strongest rays of the mid-day sun they do not require any particular covering or shade; the atmosphere therein preserves a nearly equable temperature almost the whole day, and requires only to be changed from time to time, according to circumstances. If such a bed is provided with a soil of horse dung, and a proper thickness of some fertile, finely sifted heath mould is spread thereon, layers of all sorts of flowers, early vegetables, and other plants, may be reared from seeds in it.—*Frank f. Gewerbe.*

## ACCIDENT TO BARON BERZELIUS.

By an account which we have received from Stockholm we learn, that the above very talented and eminent chymist has narrowly escaped with his life from an explosion which occurred to him during the pursuit of some investigation in which he has been engaged. The details are not given. We are happy to be enabled to state, that the injuries sustained by the first chymist of the age have been but slight, although, from the mischief occasioned by the accident, it was a matter of surprise that he should have escaped with his life.

\* \* \* *Communications, Books for Review, &c. are requested to be addressed*  
 —“To the Editors of the ANNALS OF CHYMISTRY, care of Messrs. Longman, Brown, and Co. Paternoster Row.”

THE  
ANNALS OF CHYMISTRY  
AND  
PRACTICAL PHARMACY.

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No. 18.]      FRIDAY, JANUARY 27, 1843.      [VOL. I.

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THE APPROACHING SESSION.

PARLIAMENT, says Sir Edward Coke, is omnipotent. However bold this hyperbole, it has more to palliate its license than many poetical figures ; for there are few things which the legislature cannot alter for the better or for the worse. Law, physic, and divinity, all alike fly to Parliament for relief of their difficulties ; and, like the horse in the fable, they all sometimes find that the remedy is worse than the disease—that the new restrictions are more painful than the old grievances.

In a few days the session will have begun, and bills innumerable will soon be placed on the table of the Commons. Among them, it is understood, will be one for the reform of the medical profession ; it behoves the druggist, therefore, to be up and stirring. He must be prepared to act on the defensive ; and should the legislature, egged on by more favoured practitioners, propose to annul the privileges earned by years of patient industry, he must be prepared to defend them to the uttermost. Let no man be dismayed, if after the debates of a session, nothing additional has been secured for us ; since in our situation a successful defence is a victory. Above all, let us not inconsiderately urge those who are fighting the druggist's battle, unrewarded by aught, save his approbation, into a false position ; but let us rather await the onset of our opponents, examine their weapons of attack, and rest satisfied with the assurance that the still small voice of reason must in the end secure the triumph of our principles.

Among the causes which make us doubt the expediency of too great a forwardness on our part at the present moment, is the scanty base on which the Pharmaceutical Society rests. It

comprises, as yet, but one-tenth of our profession ; and the Council represents one class alone, the masters ; so that the assistants, who form two-thirds of the body, have no vote in their proceedings.

For this reason, as well as from the inexperience in Parliamentary tactics of those who have regularly attended the meetings of the council, we should doubt the policy of an offensive attack, which would only be partial, and might probably, therefore, be ineffectual.

The strong position assumed by the druggists, when threatened by Mr. Hawes' Bill, arose from their acting in union and on the defensive : every man feeling himself attacked by the minatory clauses of this stringent bill. But were individual opinions to be sought as to an initiative conflict to be fought during the ensuing session, what a Babel would confuse the ear !

Yet, with a strange diversity of opinions without the Society, all has been listless apathy within. One active mind has directed the machine ; and the stranger who should estimate the interest felt by druggists in the events occurring around them, by the discussions of the Council, must infer that they were reckless what laws were passed to affect their position, either scientific or commercial. The remedy for this fatal calm lies with those members who have been appointed in order to meet their fellows, and discuss the interests of the profession ; while they (good souls !) have been content with the reflection that they are exceedingly respectable, and figure on the list with most worshipful company. Those who have not attended more than one-fourth of the meetings of the Council owe it to the trade to which they belong to retire, and give place to better men :

*Lusisti satis, edisti satis, atque bibisti,  
Tempus abire tibi.*

The opinions, moreover, of the great body of members must be brought into the broad glare of day, not checked, nor smothered ; and, if unrepresented in the Council, should at least find a place in the journal of the Society. A journalist who numbers four thousand readers has a proud position, and must not shrink from the duties which it imposes on him.

The session is so near that every one inquires what measures are to be pursued. For ourselves, we recommend the profession to await all attacks, but to make none ; so satisfied are we that

the preparatory training of the phalanx has yet been insufficient. In other words, the interchange of views among our brethren has hitherto been too scanty; if, indeed, the views of the Council of the Pharmaceutical Society have been at all distinctly enunciated, far less submitted to the whole society for discussion or approval. We are the last to moot any question or recommend any course which might compromise the common weal, but previous and general discussion we hold to be indispensable, for in the multitude of counsellors there is safety. We earnestly hope that no coterie will be permitted to use the Society as their hobby or their tool, and that it is too popular in its construction to be trifled with after this fashion.

Hence, we urge druggists to analyse the meetings of the Council, and we beg them to hint to those who are lax in their attendance, that they had better give up their places to men who are in earnest.

We recommend too, that the Council should collect from members and associates their opinions on the best method of improving their condition.

If the Council should be inactive, and the ordinary members alive to their interests, independent committees, in fact, an opposition would be formed—an event most deeply to be deplored. Parties interested in crushing the druggists would reproach us with not knowing our own mind, and even our zealous advocates would for a time be discouraged by our dissensions. We have been induced to make these remarks by letters from several correspondents, some of whom have drawn the darkest auguries from the notices of a contemporary to *his* correspondents, as well as from the diploma of the Pharmaceutical Society having sunk into a mere certificate of membership. They request us, as independent journalists, to direct the attention of druggists to a subject which they suppose the organ of the Society deems it premature to enter upon.

Discussion is the safety-valve of discontent. If propositions are reasonable, debate shows their merits; but if it is merely "desire of change that pretendeth the reformation \*", deliberation is a salutary exposure.

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\* Bacon.



## CHYMISTRY, OPERATIVE AND EXPERIMENTAL.

ART. II.—*Elementary Course of Pharmacy, chiefly from the German of P. A. Cap and Rudolph Brandes, collated with the Works of Phæbus, Soubeiran, Guibourt, Lecanu, Duflos, Gmelin, &c. &c.*

[Continued from page 527.]

§ 41. Thus the present state of medical nomenclature is merely temporary, and the study of it, therefore, possesses simply a transitory value, since a thorough reform must eventually arise from the present unsatisfactory state. However, we shall endeavour to guide the young pharmaceutist through this labyrinth of synonymes, and to shorten his attempt at simplification. Before we enter into the matter we may premise the principal divisions into which medicine, and the forms in which they are employed, as they are met with, in every-day use, by the apprentice. These divisions are almost entirely empirical as suggested by practical use. They are as follows:—

### I. CRUDE SUBSTANCES.

|                     |                 |                  |                  |
|---------------------|-----------------|------------------|------------------|
| Roots,              | Seeds,          | Fats,            | Metallic oxides, |
| Herbs,              | Gums,           | Nonmetallic ele- | Sulphurets,      |
| Woods,              | Resins,         | ments,           | Acids,           |
| Barks,              | Gum resins,     | Metals,          | Salts,           |
| Blossoms (flowers), | Essential oils, | Alkalics,        | Animal sub-      |
| Fruits,             | Fat oils,       | Earths,          | stances.         |

### II. PREPARATIONS.

|             |                  |                   |                   |
|-------------|------------------|-------------------|-------------------|
| Species,    | Juices,          | Plasters.         | Earths.           |
| Powders.    | Confections,     | Extracts.         | Mineral acids,    |
|             | Electuaries.     |                   | Organic acids.    |
| Liquors,    | Medicated vine-  | Distilled waters, | Alkaline salts,   |
| Infusions,  | gars,            | Spirits,          | Earthy salts,     |
| Decoctions. | Medicated wines, | Ethers.           | Metallic salts.   |
| Mixtures,   | Medicated oils,  |                   |                   |
| Solutions,  | Tinctures.       | Metalloids,       |                   |
| Emulsions.  |                  | Metals,           | Alkaloids.        |
|             | Liniments,       | Sulphurets,       |                   |
| Boluses,    | Ointments,       | Metallic oxides,  | Indifferent orga- |
| Pills.      | Cerates,         | Alkalies,         | nic substances.   |

By examining the substances which come under his observation, the apprentice will easily acquire the capability of deciding into which of these classes any medicine should be placed; and, in cases of doubt, his superiors will always be ready to afford him the required information. Thus, by comparing the various names, which he gradually adds to those already learnt, he will insensibly acquire a considerable series of facts, which will be found of the greatest use in reference to his further progress in the knowledge of drugs. He will soon be able to distinguish

the peculiarities, by which the individuals of each class are connected with each other.

We now return to the modern scientific labours on this subject, hoping thus to facilitate a clear and easy conception of the matter; although we are obliged to mention, that these divisions and names have not been introduced into general practical use, nor are they sufficiently and universally known. We hope, however, to introduce them more generally by our present treatise, and thus to contribute to their more general application, provided such names be deemed appropriate.

§ 42. Since the simple medicines of the second class are the result of a practical operation, as by *division* or *digestion*, they are divided into two classes according to the kind of this operation; and then, further, according to the objects of natural history, into *genera*; and each genus into *species*. The form of the preparation gives the *generic name* and the natural body, whilst the substance on which the operation is performed furnishes the *specific name*. Thus, the word *Pulpa Tamarindorum* distinctly indicates, that this medicine is the result of procuring the pulp of the fruit of tamarinds; and as it is further known, that the pulp is obtained by dividing the substance, the inference is naturally drawn, that this preparation appertains to the class *divisio*. The specific name further indicates, that one base only is contained therein; and this leads to the inference, that this remedy appertains to the class of simple medicines. The expression *Extractum Conii* may be interpreted in a similar way; with the only difference, that as extracts are procured in various ways, or by different means, it is, therefore, necessary to express that of which use has been made, by an addition to the generic name; *e. g.*—

Extractum *spirituosum* Ratanhiæ,  
Extractum *aguosum* Belladonnæ,  
Extractum *e succo* Conii,

signifies that the *extractum ratanhiæ* is prepared by means of spirits of wine, the *extractum belladonnæ* by means of water, the *extractum conii* from the expressed juice of the plant. The word indicating the operation, or the name of the means used for making the extract, is also frequently placed at the end of the names, as *e. g.* *extractum ratanhiæ spirituosum*, *extractum belladonnæ aguosum*, *extractum conii e succo*, vel *succus conii spissatus*.

§ 43. For the nomenclature of medicines of the third class other principles have been employed. Before, however, we explain them, we may add a few words on the necessity of distinguishing between medicines obtained by *mixture* and those obtained by *combination*. Although the phenomena in the preparation of both have a great resemblance, several remarkable

differences formerly caused them to be divided into *Galenical* and *chymical* medicines, and even now it is almost impossible not to be struck with a certain similarity in their classification. It is obvious that, in chymicals, which form the fourth class, at the moment when the substances from which they are prepared come into contact with each other, *combination* takes place ; that is to say, that the bodies which form the components of the combination lose those peculiar properties by which they were previously distinguished, and that their product acquires new properties peculiar to itself. It is, indeed, true that similar changes may take place in the course of time in compounds prepared by mixture ; these changes, however, do not occur with the same rapidity, are less characteristic, and, even a long time after such mixture, the peculiar properties of its components can be still discerned therein, without a mutual exchange, or a supposed exchange, of the components taking place. This case commonly occurs in those preparations, the bases of which are vegetable or animal substances. At all events this distinction is sufficient for dividing the whole number of compound medicines into two large classes, until a better distinction is discovered. We now return to their nomenclature.

§ 44. The *mixed compound medicines*, forming those of the third class, have generally one or more simple medicines for their base, the efficient components of which are dissolved by another body, in which they are floating or involved, and which is termed the *excipient* ; water, alcohol, fat, honey, &c. are these excipients. The *excipients* in such a case furnishes, for compound medicines, the *generic*, and the chief base the *specific* name. The name *Vinum Ferri*, *Mel Rosarum*, &c. show that the medical principles of iron are dissolved in wine ; those of roses divided among honey.

It happens, however, also, that in medicines of this class the excipient does not prevail in quantity, or indeed that there is no excipient whatever. In such a case, the form, the degree of consistence, and even the manner in which the medicine is applied, are taken as a type of the genus, e. g. *pills*, *conserves*, *cataplasms*. However, it usually occurs that the most active substance which prevails in the whole of the mixture, furnishes the specific name. Sometimes the name of a secondary substance is added, in case that such term is advisable for giving to the name clearer distinction, e. g. *Tinctura Rhei vinosa*, or only the word *composita*, in order to indicate that the other components are contained therein. Thus the whole of the numerous class of these medicines, the excipients of which are water, sugar, wine, alcohol, ether, vinegar, beer, oil, fat, honey, or starch, form as many genera as there are excipients, which again are brought into subdivisions according to the operation employed for preparing these medicines. These subdivisions are formed by

simply changing the terminating syllable of those words, as commenced to be practised lately in France, e. g. *Alcoolé, Alcoolat*; or a special name is given to the subdivision, which, for the sake of simplicity, is added in the place of the genus, e. g. *juices, lozenges, pastes*.

The system given for this class of medicines is, doubtless, the most rational. There is nothing difficult but the variety of names proposed by the authors of the new systems at present, and until those names which are to have the preference have been sanctioned by universal consent, it is necessary to become acquainted with this classification, and to employ, for the designation of the genera and species, the most simple and correct names of ancient nomenclature. The apprentice will soon become familiar, by practice, with these synonymes, and with all the details connected with their use.

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ART. III.—*Decomposition of Chromate of Barytes by Sulphuric Acid.*

ANTHON examined the products of the decomposition of chromate of barytes by means of sulphuric acid, respecting which there are different statements. He found that the precipitate consisted of—

|                             |       |
|-----------------------------|-------|
| Sulphate of barytes . . . . | 106.1 |
| Chromate of barytes . . . . | 11.0  |

*Buchner's Report.*

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ART. IV.—*Remarks on the British and United States Pharmacopœias.*

THE latest editions of these Pharmacopœias are the Dublin Pharmacopœia of 1826; the London, of 1836; the Edinburgh, of 1841; and the United States, of 1842. The Edinburgh Pharmacopœia of 1841 is the second edition, with corrections, of the recently revised work; the first edition having appeared in 1839. The revised work presents one striking and judicious change; namely, its publication in the English language; the Latin being retained only for the officinal names. The United States Pharmacopœia was first published in 1820; and the edition of 1842 is the result of the second decennial revision. As originally printed, it was in Latin, with an English translation on the opposite page. But upon the recent revision, it was deemed advisable to follow the example of the Edinburgh College, and print every part in the English language, except the officinal names.

Having originally derived the greater part of our pharmacy from the British Islands, we are necessarily much interested in the progress of pharmacology in the British Dominions. Our first Pharmacopœia was chiefly made up of selections of

formulae from the British Pharmacopœias; and our successive revisions have been much aided by a careful study of the progressive improvements made in these works. So, also, there is reason to believe that aid has been afforded to our British brethren in return. Thus it is that the pharmacy of the two countries is so linked together, that we, on this side of the water, feel the importance of studying the changes made in the Pharmacopœias of the British empire.

From the length of time that has elapsed since the last revision of the Dublin Pharmacopœia, now sixteen years, it is to be hoped that a revised edition of that work will shortly appear, in which advantage will be taken of the great improvements which have been made in the interim, and every reasonable concession in nomenclature be made in favour of the important principle of uniformity of officinal names. As yet the three British colleges have not been able to agree upon one Pharmacopœia for the British empire—a result which, if ever accomplished, will not only be an important benefit to the British nation, but an influential step in the progress of pharmacy, wherever the English language is spoken. The present Edinburgh Pharmacopœia is the result of a revision after an interval of twenty-two years; and the present London work, after the lapse of twelve years.

The subject of nomenclature, though secondary to the paramount object of the proper preparation of medicines, is confessedly very important. A number of synonymes creates confusion, obstructs the advancement of the medical and pharmaceutical student, and leads to serious mistakes. Admitting these positions, it is highly gratifying to observe that the discrepancies in nomenclature are becoming less and less with every revision of the British Pharmacopœias.

One great step in the simplification of nomenclature was made in 1820, in the first United States Pharmacopœia. In the preface to that work it is stated that “a single word is always used for the officinal name of the medicine, wherever such a word is expressive, and without ambiguity. For example, the name *Jalapa* is used instead of *Convolvulus Jalapa* of the Edinburgh Pharmacopœia, and *Jalapæ Radix* of the London; *Colocynthis*, instead of *Cucumis Colocynthis*, and *Colocynthis Pulpa*, &c. The advantages of this mode are, that the name stands in the nominative case; that it expresses the medicine, and nothing else; that it is short and explicit, and does not require to be mutilated in practical use, as long names will inevitably be.” The principle of nomenclature here laid down was happily applied in a great number of cases, and has since been successively adopted in the London and Edinburgh Pharmacopœias. The extent of this reform in nomenclature, and the influence its adoption has had in diminishing synonymes, are shown in the following table:—

| Pharm. Edinburgh, 1817.                 | Pharm. London, 1824.          | Pharm. U. S. 1830.<br>L. 1836, and E. 1841. |
|-----------------------------------------|-------------------------------|---------------------------------------------|
| Allii Sativi Radix.                     | Allii Radix.                  | Allinm.                                     |
| Aloes Extractum.                        | Alōes spicatæ Ex-<br>tractum. | Aloe*.                                      |
| Pimpinellæ Anisi Semina.                | Anisi Semina.                 | Anisum.                                     |
| Anthemidis Nobilis Flores.              | Anthemidis Flores.            | Anthemis.                                   |
| Cochleariæ Armoraciæ Radix.             | Armoraciæ Radix.              | Armoracia.                                  |
| Ferulæ Assæfœtidæ Gummi-<br>resina.     | Assæfœtidæ Gummi-<br>resina.  | Assæfœtida.                                 |
| Atropæ Belladonnæ Folia.                | Belladonnæ Folia.             | Belladonna.                                 |
| Canellæ Albæ Cortex.                    | Canellæ Cortex.               | Canella.                                    |
| Capsici Anni Fructus.                   | Capsici Baccæ.                | Capsicum.                                   |
| Amomi Repentis Semina.                  | Cardamoni Semina.             | Cardamomum.                                 |
| Crotonis Eleutheriæ Cortex.             | Cascarillæ Cortex.            | Cascarilla.                                 |
| Acaciæ Catechu Extractum.               | Catechu Extractum.            | Catechu.                                    |
| Lauri Cinnamomi Cortex.                 | Cinnamomi Cortex.             | Cinnamomum.                                 |
| Cucumeris Colocynthis Pulpa.            | Colocynthis Pulpa.            | Colocynthis.                                |
| Coriandri Sativi Semina.                | Coriandri Semina.             | Coriandrum.                                 |
| Croci Sativi Stigmata.                  | Croci Stigmata.               | Crocus.                                     |
| Solani Dulcamaræ Caules.                | Dulcamaræ Caulis.             | Dulcamara.                                  |
| Anethi Fœniculi Semina.                 | Fœniculi Semina.              | Fœniculum.                                  |
| Bubonis Galbani Gummi-resina.           | Galbani Gummi-resina.         | Galbanum.                                   |
| Gentianæ Luteæ Radix.                   | Gentianæ Radix.               | Gentiana.                                   |
| Hæmatoxyli Campechiani<br>Lignum.       | Hæmatoxyli Lig-<br>num.       | Hæmatoxylon, U.S., E.<br>Hæmatoxylum, L.    |
| Hordei Distichi Semina.                 | Hordei Semina.                | Hordeum.                                    |
| Ipecacuanhæ Radix.                      | Ipecacuanhæ Radix.            | Ipecacuanha.                                |
| Convolvuli Jalapæ Radix.                | Jalapæ radix.                 | Jalap.                                      |
| Lavandulæ Spicæ Flores.                 | Lavandulæ Flores.             | Lavandula.                                  |
| Myristicæ Moschatæ Nucleus.             | Myristicæ Nuclei.             | Myristica.                                  |
| Myrti Pimentæ Fructus.                  | Pimentæ Baccæ.                | Pimenta.                                    |
| Quassiæ Excelsæ Lignum.                 | Quassiæ Lignum.               | Quassia.                                    |
| Rhei Radix.                             | Rhei Radix.                   | Rheum.                                      |
| Rorismarini Officinalis Ca-<br>cumina.  | Rosmarini Cacumina.           | Rosmarinus.                                 |
| Juniperi Sabinæ Folia.                  | Sabinæ Folia.                 | Sabina.                                     |
| Convolvuli Scammonii Gum-<br>mi-Resina. | Scammonii Gum-<br>mi-resina.  | Scammonium.                                 |
| Scillæ Maritimæ Radix.                  | Scillæ Radix.                 | Scilla.                                     |
| Polygalæ Senegæ Radix.                  | Senegæ Radix.                 | Senega.                                     |
| Cassie Sennæ Folia.                     | Sennæ Folia.                  | Senna*.                                     |
| Aristolochiæ Serpentinæ Ra-<br>dix.     | Serpentinæ Radix.             | Serpentaria.                                |
| Sinapis Albæ Semina.                    | Sinapis Semina.               | Sinapis, U.S., L.<br>Sinapi, E.             |
| Spigeliæ Marilandicæ Radix.             | Spigeliæ Radix.               | Spigelia.                                   |
| Nicotiani Tabaci Folia.                 | Tabaci Folia.                 | Tabacum.                                    |
| Tamarindi Indicæ Fructus.               | Tamarindi Pulpa.              | Tamarindus.                                 |
| Tormentillæ Erectæ Radix.               | Tormentillæ Radix.            | Tormentilla.                                |
| Rhois Toxicodendri Folia.               | Toxicodendri Folia.           | Toxicodendron†                              |
| Arbuti Uvæ Ursi Folia.                  | Uvæ Ursi Folia.               | Uva ursi.                                   |
| Valerianæ Officinalis Radix.            | Valerianæ Radix.              | Valeriana.                                  |
| Amomi Zingiberis Radix.                 | Zingiberis Radix.             | Zingiber.                                   |

\* In the Edinburgh Pharmacopœia, in three subdivisions, *Aloë Barbadosensis*, *Indica*, and *Socotorina*.

\* In the Edinburgh Pharmacopœia, in two subdivisions,—*Senna Alexandrina* and *Indica*.

† Except the Edin. Pharmacopœia, from which this medicine is now dismissed.

By the foregoing list it appears that, in a number of cases, the Edinburgh and London Pharmacopœias have adopted the nomenclature of the United States Pharmacopœia of 1820. In the case of the London Pharmacopœia this was not done in 1824, the year in which the first revision of that work took place after the reform introduced by our first Pharmacopœia, but was postponed until the revision of 1836. This is distinctly shown by the table.

In the following names the United States Pharmacopœia of 1830 has been followed.

| Pharm. Edinburgh, 1817.        | Pharm. London, 1824.            | Pharm. U.S. 1830,<br>L. 1836, and E. 1841. |
|--------------------------------|---------------------------------|--------------------------------------------|
| Eugenie Caryophyllatæ Flores.  | Caryophylei.<br>Kramerie Radix. | Caryophyllus.<br>Krameria.                 |
| Daphnes Mezerei Cortex.        | Mezerei Cortex.                 | { Mezereum, U.S., L.*<br>Mezereon, E.      |
| Rosæ Centifoliæ Petala.        | Rosæ centifoliæ Petala.         | Rosa Centifolia.                           |
| Rosæ Gallicæ.                  | Rosæ Gallicæ Petala.            | Rosa Gallica.                              |
| Quassie Simarubæ Cortex.       | Simaroubæ Cortex.               | Simaruba†.                                 |
| Styracis Officinalis Balsamum. | Styracis Balsamum.              | Styrax.                                    |
| Leontodi Taraxaci Radix.       | Taraxaci Radix.                 | Taraxacum.                                 |

In the instances, given in these tables, not only the principle of nomenclature, but the exact name of the U. S. Pharmacopœia, has been adopted. In many other cases, the principle has been adopted, but the medicine is either not included in the U. S. Pharmacopœia list, or is recognised under a different name. The following list presents a view of a majority of these cases:—

| Pharm. Edinburgh, 1817.       | Pharm. London, 1824.     | Pharm. United States, 1830,<br>Lond 1836, and Edin. 1841. |
|-------------------------------|--------------------------|-----------------------------------------------------------|
| Acori Calami Radix . . .      | Calami Radix . . .       | { Calamus, U.S.<br>Acorus, L.<br>Calamus aromaticus, E.   |
|                               | Anethi Semina . . .      | Anethum, L. E.                                            |
|                               | Asari Folia . . .        | Asarum, L.                                                |
| Aspidii Filicis Maris Radix . | Filicis Radix . . .      | { Filix Mas. U.S. 1830.<br>Aspidium, L.<br>Filix, E.      |
|                               | Aurantii Baccæ . . .     | Aurantium, L.                                             |
| Avenæ Sativæ Semina . . .     | Avenæ Semina . . .       | Avena, L. E.                                              |
| Colombæ Radix . . . . .       | Calumba . . . . .        | { Colomba, U.S.<br>Calumba, L. E.                         |
|                               | Cardamines Flores . . .  | Cardamines, L.                                            |
| Cari Carui Semina . . . . .   | Carui Semina . . . . .   | { Carum, U.S.<br>Carui, L. E.                             |
|                               |                          | { Cassia fistula, U.S.                                    |
| Cassie Fistulæ Fructus . . .  | Cassie Pulpa . . . . .   | { Cassia, L.<br>Cassie pulpa, E.                          |
| Chironie Centaurii Summitates | Centaurii Cacumina . . . | Centaurium, L. E.                                         |
| Menispermii Cocculi Baccæ .   |                          | Cocculus, E.                                              |

\* Mezereon in the United States Pharmacopœia of 1820.

† Simarouba in the United States Pharmacopœia of 1820.

| Pharm. Edinburgh, 1817.       | Pharm. London, 1824.                 | Pharm. United States, 1820.<br>Lond. 1836, and Edin. 1841 |
|-------------------------------|--------------------------------------|-----------------------------------------------------------|
| Lichen Islandicus . . . .     | Lichen . . . .                       | {Lichen, U.S.*<br>{Cetraria, L. E.                        |
|                               | Contrajervæ Radix                    | {Contrayerva, U.S.<br>{Contrajerva, L.                    |
| Bonplandiæ Trifoliatæ Cortex  | Cuspariæ Cortex                      | {Angustura, U.S.<br>{Cusparia, L. E.                      |
|                               | Cydoniæ Semina . .                   | {Cydonia, L.                                              |
|                               | Cumini Semina . .                    | {Cyminum, L.<br>{Cuminum, E.                              |
|                               | Elaterii Pepones . .                 | {Elaterium, L.                                            |
|                               | Euphorbiæ Gummi-<br>resina . . . , } | {Euphorbium, L. E.                                        |
| Fici Caricæ Fructus . . .     | Caricæ Fructus . .                   | {Ficus, U.S. 1830.<br>{Fici, L. E.                        |
| Hellebori nigri Radix . .     | Hellebori nigri Radix                | {Helleborus niger, U.S.†<br>{Helleborus, L. E.            |
| Humuli Lupuli Strobili . .    | Humuli Strobili . .                  | {Humulus, U.S.<br>{Lupulus, L. E.                         |
|                               | Mori Baccæ . . . .                   | {Mora, L.                                                 |
| Dolichi Prurientis Pubes . .  | Dolichi Pubes . . .                  | {Dolichos, U.S.‡<br>{Mucuna, L. E.                        |
|                               | Opopanax Gummi-<br>resina . . . . }  | {Opopanax, L.                                             |
| Papaveris Somniferi Capsulæ   | Papaveris Capsulæ .                  | {Papaver, L. E.§<br>{Cubeba, U.S.                         |
|                               | Cubeba . . . . .                     | {Piper cubeba, L.  <br>{Cubebæ, E.                        |
|                               | Porri Radix . . . .                  | {Porrus, L.                                               |
| Pterocarpi Santalini Lignum   | Pterocarpi Lignum .                  | {Santalum, U.S.<br>{Pterocarpus, L. E.                    |
| Anthemidis Pyrethri Radix     | Pyrethri Radix . . .                 | {Pyrethrum, L. E.§                                        |
|                               | Quercus Cortex . . .                 | {Quercus, L.                                              |
|                               | Rhamni Baccæ . . .                   | {Rhamnus, L.                                              |
|                               | Rheædos Petala . . .                 | {Rheas, L. E.                                             |
| Rosæ Caninæ Fructus . . .     | Rosa caninæ Pnlpa .                  | {Rosa canina, L.<br>{Rosæ fructus, E.                     |
|                               | Acetosæ Folia . . .                  | {Rumex, L.                                                |
| Rutæ Graveolentis Herba .     | Rutæ Folia . . . .                   | {Ruta, L. E.§                                             |
| Sambuci Nigræ Flores . . .    | Sambuci Flores . . .                 | {Sambucus, L. E.§                                         |
| Smilacis Sarsaparillæ Radix   | Sarsaparillæ Radix .                 | {Sarsaparilla, U.S.<br>{Sarza, L. E.                      |
|                               |                                      | {Spartium, U.S.                                           |
| Spartii Scoparii Summitates   | Spartii Cucumina . .                 | {Scoparius, L.<br>{Scoparium, E.                          |
| Delphinii Staphisagriæ Semina | Staphisagriæ Semina                  | {Staphisagria, L. E.                                      |
| Veratri Albi Radix . . . .    | Veratri Radix . . .                  | {Veratrum album, U.S.<br>{Veratrum, L. E.                 |
|                               | Ulmi Cortex . . . .                  | {Ulmus, L.                                                |

\* Cetraria is adopted as the name in the U. S. Pharmacopœia of 1842.

† Helleborus, in the U. S. Pharmacopœia of 1842.

‡ Mucuna is adopted as the name of this medicine in the U. S. Pharm. of 1842.

§ Made official under this name in the U. S. Pharmacopœia of 1842.

|| Here, unfortunately, the London College have deserted their name of 1824.



The want of agreement in the names in the third column of the above table, arises, in several instances, from the generic and specific names of the plants, being, in different cases, selected to express the medicine. In some cases, the name of the U. S. Pharmacopœia, being less concise than that of the last L. and E. Pharmacopœias, seems to be a departure from the principle of nomenclature, recognised from the beginning in our national work; as in the instances of *Helleborus niger* for *Helleborus*, and *Veratrum album* for *Veratrum*. But these longer names were necessary in the U. S. Pharmacopœia, from the fact that two hellebores and two veratrums were originally recognised as officinal in that work. Two veratrums are still retained; but as *Helleborus foetidus* has been dismissed upon the recent revision, the single word *Helleborus*, as in the L. and E. Pharmacopœias, now expresses the medicine formerly called *Helleborus niger*.

The system of concise names for vegetable medicines has generally been followed out by the L. and E. Pharmacopœias in the nomenclature of the new articles introduced into those works. In proof of this, we subjoin a list of new L. and E. officinals from the vegetable kingdom; the names printed in italics having been previously adopted for the medicines they represent in the U. S. Pharmacopœia:—*Anethum*, E.; *Canna* (*Tous-les-mois*), E.; *Chimaphila*, L. (*Pyrola*, E.); *Chiretta*, E.; *Cubebae*, E.; *Cuminum*, E.; *Curcuma*, L. E.; *Diosma*, L. (*Buchu*, E.); *Elemi*, E.; *Ergota*, L. E.; *Euphorbium*, E.; *Gossypium* (*raw cotton*), E.; *Krameria*, E.; *Lacmus*, L. E.; *Lactucarium*, L.; *Lobelia*, L. E.; *Maranta*, L. E.; *Nux Vomica*, L. E.; *Origanum*, E.; *Pereira*, L. E.; *Rhocas*, E.; *Sabadilla*, L. E.; *Sago*, L. E.; *Tapioca*, E. In the U. S. Pharmacopœia, *Cubebæ* have been officinal since 1820, under the name, which they still retain, of *Cubeba*; and *Ergot* since 1830, first under the name of *Secale Cornutum*, and on the last revision (1842) under the changed name of *Ergota*, to make it conform with the name under which it has been recently admitted into the officinal list of the L. and E. Colleges. *Cubebæ*, when first introduced by the London College (1824), were called *Cubeba*, but subsequently (in 1836) was denominated *Piper Cubeba*. This was an injudicious change; for it violated the plan of brief names for vegetable medicines, irrespective of botanical titles, which was adopted for the first time in the London Pharmacopœia of 1836.

In the additions which have been made to the vegetable *Materia Medica* of the U. S. Pharmacopœia of 1842, the same principle of brevity in nomenclature, enforced and adopted in 1820, in our first Pharmacopœia, and carried out in 1830, has been still adhered to. This is shown in the following list of newly-

introduced names, those in italics having been previously adopted in one or more of the British Pharmacopœias ;—*Absinthium*. *Althæa*, *Cetraria*, *Chondrus*, *Diosma*, *Matricaria*, *Melissa*, *Panax*, *Papaver*, *Pareira*. *Pyrethrum*, *Ruta*, *Sabadilla*, *Salvia*, and *Sam-bucus*.

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ART. V.—*On the Analysis of Oxgall, and the Characteristic Properties of its Elements.* By the Baron J. BERZELIUS.

[From the Kongl. Vet. Acad. Handl.]

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[Continued from page 539.]

2. *Fellinic acid*.—It seems that this acid, in combination with bilin, forms the peculiar bitter element of gall. It is a matter of difficulty to decide whether it is contained in perfectly fresh gall of the healthy animal. I mentioned before that perfectly fresh gall may be mixed with sulphuric acid in any proportion whatever, without bilifellinic acid being precipitated therefrom, although the latter is insoluble in sulphuric acid mixed with a moderate quantity of water. Basic superacetate of lead, on the other hand, always produces a precipitate in fresh gall, and the same is the case with a solution of its alcoholic extract: this precipitate chiefly consisting of basic bilifellinate of lead.

Fellinic acid, in its pure state, possesses the following properties:—After being precipitated from its salts and dried, it forms a snow-white earthy mass, which does not at all cohere, and leaves behind it, if touched, stains, like chalk. It has no smell, nor any taste at first; but after some time it assumes an astringent bitter taste, reddens moist litmus paper, fuses in boiling water, on the surface of which it appears floating, but sinks to the bottom as soon as the temperature descends to some degrees under  $+100^{\circ}=212^{\circ}$  F. Without being in contact with water it becomes at  $+80^{\circ}=176^{\circ}$  F. transparent, and coheres, without forming, however, a liquid mass. It melts only at  $+110^{\circ}=280^{\circ}$  F. If submitted to dry distillation with hydrate of potassa it does not yield any ammonia; it does not, therefore, contain any azote. Heated in the open air it fuses, inflates, catches fire, and burns with a sooty and bright flame, like resin. By placing it on moist litmus paper, the latter becomes reddened. It is almost insoluble in cold water; and this neither assumes therefrom any taste, nor the faculty of reddening the litmus paper. It is likewise very inconsiderably dissolved by boiling water; the solution grows milky and turbid on cooling, without yielding any precipitate, even after some space of time has elapsed. The boiling solution imparts a perceptible red tinge to litmus paper. It is dissolved in any proportion by alcohol, even by common

alcohol containing water. It likewise dissolves to a great extent in ether; and after the evaporation of the ether, as well as of the alcohol, it is left behind in the form of a clear, transparent mass. Fellinic acid dissolves to a slight extent in cold concentrated acetic acid; to a greater extent, however, if the temperature of the latter is increased to the boiling point, forming, as the solution cools, crystalline grains, by which the whole of the liquor is transformed into a solid mass. The mother-liquor then remaining contains fellinic acid in solution, is of an acid but not bitter taste: it is precipitated by water, and the precipitate slightly coheres, but it is dissolved again by heating the mixture. The acetic acid evaporates at the same time with the water, and the fellinic acid gradually deposits. From the granular crystalline mass placed on blotting paper, in order to remove the mother-liquor, acetic acid escapes by evaporation into the air, and the fellinic acid is left behind in granular crystals, glittering when exposed to the sun-rays.

It combines with salt bases, and expels from the carbonate of an alkali, carbonic acid, although their affinity is not very strong. If the acid be employed in excess, a salt is obtained saturated with alkali to such a degree that it does not act alkaline in its dissolved condition. This action, however, takes place if a drop is allowed to dry up on litmus paper. If a current of carbonic acid gas is introduced into the solution, the latter becomes turbid, disengaging at the same time a double saline fellinate, which remains for a long time in suspension. The fellinates are of a strong and purely bitter taste, like gall, without the slightest sweetish taste afterwards, as bilin, or before, as in the cholates. The solution of fellinic acid foams, like soaps-suds, and may, in like manner, be blown out into large bubbles. During evaporation, at an increased temperature, the solution gives out a slight odour of gall.

The *salts with alkaline bases* condense during drying to a gum-like, cracked, and transparent mass, which easily dissolves in water and alcohol, but not in ether. The salt of ammonia, if evaporated with the aid of heat, is partly decomposed, and afterwards slowly dissolves in a small quantity of water: this solution becomes turbid if further diluted. If a great quantity of water is at once added, the neutral salt is dissolved, leaving the acid behind in the form of a white mass, which covers the sides of the glass vessel. It is difficult to separate the double fellinates by filtration; after being washed they form white powders resembling the acid in appearance.

With earths or metallic oxides, it generally forms salts, which dissolve with difficulty, or not at all, in water, but which, however, are dissolved by alcohol.

The salt of barytes is, in this respect, the most remarkable

among the salts of this acid, because it leads to an operation for separating fellinic acid from other acids. It may be immediately obtained by heating the acid with the water of barytes. when at first a tough, double fellinate is formed, since afterwards, when the acid is completely saturated, a softer mass gradually sinks to the bottom. Produced by a double decomposition, it forms at the moment of precipitation, white caseous flakes, which soon unite, forming a soft, plaster-like mass. It dissolves with difficulty in water, without being insoluble therein. The solution, if mixed with any acid, becomes milky, and some time passes before the acid disengages and deposits. It dissolves more easily in boiling water, and the dissolved parts adhere to the inside of the glass vessel in small clear drops, whilst the liquor is being refrigerated. The same takes place if the solution is evaporated by the action of an increased temperature. The salt dissolves easily in alcohol, and, after evaporation of the latter, it is left behind in the form of a transparent and resinous mass. By carbonic acid gas conducted into the alcoholic solution, the earth of barytes is completely precipitated, and the fellinic acid remains behind in the solution. It is insoluble in ether.

The *salt of lime* resembles that of barytes, forming a glutinous mass, which is easier dissolved by water than the salt of barytes.

The *salt of magnesia* is acted upon and affected in similar manner, but still more rapidly dissolved than the salt of lime.

The *salt of alumina* (obtained by double decomposition with chloride of aluminum) is a white, flaky precipitate, quite insoluble in water.

The *salt of zirconia* (prepared by double decomposition with choride of zirconium), yields a slight opalescence, without producing any precipitate, even after remaining twenty-four hours.

The *salt of protoxide of manganum* (formed with chloride of manganium), is again dissolved, after being precipitated; those parts which finally form a lasting precipitate are a tough mass.

The *salt of oxide of zinc* (obtained with choride of zinc), forms a flaky non-glutinous precipitate, which dissolves in water, with some difficulty.

The *salt of lead* is acted upon in the same manner as salt of barytes. With the oxide of lead in excess, it forms a transparent, plasterlike mass, which yields with alcohol an alkaline solution, and from which the oxide of lead is not precipitated by water of barytes.

The *salt of oxide of copper* (formed with chloride of copper, is a flaky, pale, green precipitate, insoluble in water.

The *salt of oxide of quicksilver* appears to be insoluble, because a solution of chloride of copper, with the fellinate of alkali,

does not yield any precipitate, although the liquor becomes slightly opaline.

The salt of oxide of silver is a glutinous combination, somewhat soluble in water, and easily dissolving in alcohol.

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ART. VI.—*Observations on the Volatile Oil of Gaultheria Procumbens, proving it to be an Hydracid analogous to Saliculous Acid.* By WILLIAM PROCTER, Jun.

[Concluded from page 504.]

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#### OIL OF GAULTHERIA AND CHLORINE.

WHEN a current of chlorine is passed through oil of gaultheria it is rapidly absorbed, hydrochloric acid is evolved, the oil assumes a yellow colour, and becomes very hot. If the chlorine is continued until the evolution of the hydrochloric acid ceases, the temperature of the oil decreases, and it becomes a crystalline mass. By dissolving this in boiling absolute alcohol, the compound is obtained, on cooling, in transparent rhomboidal plates, slightly tinged with yellow. This substance is insoluble in water, but soluble in alcohol, ether, and solutions of the fixed alkalies. When the crystals are dropped into a concentrated solution of potassa they turn red, and on the application of heat are dissolved, forming a deep red solution. By adding an acid to this solution the compound is precipitated unchanged. When heated, it fuses at a temperature of 220° F. into a colourless liquid, which readily crystallizes on cooling.

When heated in close vessels, it sublimes at a few degrees above its fusing point, and condenses in colourless rhomboidal crystals. Its vapour burns with a flame edged with green. Sulphuric acid dissolves it, from which it is precipitated by water. Its taste is peppery, and its odour peculiar. When the solution of this chlorine compound in potassa, is evaporated, the salt is obtained in reddish coloured crystals.

The solution of this compound of oil of gaultheria with chlorine in potassa, without decomposition, together with its other characteristics, renders its identity with chlorosaliculinic acid strongly probable.

#### OIL OF GAULTHERIA AND BROMINE.

If an excess of bromine is added to oil of gaultheria, the mixture instantly becomes hot, and hydrobromic acid is evolved. When all the oil has combined, the whole becomes a crystalline mass. By the application of a gentle heat the excess of bromine and hydrobromic acid is driven off, and, on cooling, the compound is obtained perfectly pure. Its solution in hot alcohol on cooling, yields tufts of acicular crystals. It fuses at 140°, and

commences subliming at 150° F. ; but does not recrystallize for some time after cooling. When heated in close vessels, its vapour condenses in minute drops, which become crystalline by standing. Its taste and odour are peculiar, and differ from the chlorine compound. Its solution in potassa is light yellow, from which it is precipitated perfectly white by an acid.

#### OIL OF GAULTHERIA AND IODINE.

Oil of gaultheria dissolves iodine readily, but does not combine directly with it, as the solution may be heated without the production of hydriodic acid. When, however, either of the preceding compounds is mixed intimately with iodide of potassium, the mixture acquires a brownish colour ; and, when heated very gradually, a red vapour arises, and condenses in a crystalline form on the sides of the tube. This substance is insoluble in water, soluble in alcohol and ether, and fuses readily.

#### OIL OF GAULTHERIA AND CYANOGEN.

When either the chlorine or bromine compound of oil of gaultheria is intimately mixed with cyanuret of potassium or mercury, and heated in a tube, a white vapour rises, and condenses in the form of a yellow oil, which, by standing, becomes crystalline. Its odour is very peculiar. It crystallizes in needles, and is soluble in alcohol and ether.

#### ACTION OF AMMONIA ON THE COMPOUND OF CHLORINE AND OIL OF GAULTHERIA.

A portion of the chlorine compound, which had been fused several times, so as to entirely deprive it of any hydrochloric acid, was placed in a long tube, and a current of dry ammonia passed over it for some time. The ammonia changed the colour from white to light grey, and no moisture was condensed in the tube. When washed in water, this substance communicates a yellowish colour to that fluid ; on adding nitrate of silver a white precipitate is produced, which is soluble in ammonia. After being dried it was dissolved in hot alcohol, and was obtained in crystalline plates, of a light yellow colour, by cooling. These were soluble in a hot solution of potassa, without the separation of ammonia, forming a yellow solution, from which a white precipitate is thrown down by an acid. This substance does not appear to have the characters of *chlorosaliculimide*.

#### ACTION OF NITRIC ACID ON OIL OF GAULTHERIA.

When oil of gaultheria is added to nitric acid, sp. gr. 1.40, no immediate action results ; but if gently heated, copious fumes of nitrous acid are evolved, and the oil is converted into a yellow crystalline substance. By washing with water, and dissolving

it in boiling alcohol, it is obtained in silky crystals, which have a pale yellow colour, and acid properties. It is slightly soluble in water, to which, however, it communicates a yellow colour; but alcohol and ether dissolve it more readily. When heated to 200° F., the crystals fuse into a yellow liquid; more heat causes a partial sublimation, leaving a residue of charcoal. It changes litmus to yellow, without a trace of red. Its solution colours the skin and nails deep yellow, and has little taste, but causes an irritation of the throat, which excites coughing.

This acid combines with potassa to form a deep yellow crystalline salt. Its ammonia salt crystallizes in bright yellow needles, which, when heated, fuse, and then sublime in small yellow crystals unchanged. It does not detonate when heated, like other salts of this acid.

A solution of either of these salts is precipitated yellow by acetate of lead; green, by sulphate of copper; and yellow, by nitrate of mercury. Sulphate of zinc and nitrate of silver are not changed. The addition of a strong acid decomposes these salts, their acid being precipitated in a crystalline form.

When the salts of potassa or lead are suddenly heated they fulminate, and leave a black carbonaceous residue. This feature characterizes the salts of nitrosaliculic acid.

When oil of gaultheria is dropped into fuming nitric acid, a violent re-action takes place; the mixture becomes hot, and much nitrous acid is given off. A deep orange coloured substance is formed, with a resinous aspect, which is deposited in yellow scales, from its hot alcoholic solution by cooling. This substance has a very bitter disagreeable taste, and a peculiar odour. It dissolves in potassa, forming a yellow solution, but is not precipitated when the alkali is saturated with an acid.

In conclusion it may be observed, that the foregoing observations prove, that the oil of Gaultheria procumbens is a hydracid, forming salts with bases, and compounds with chlorine, bromine, and iodine, like saliculous acid; but, at the same time, it exhibits differences in its re-actions which render the identity of the two substances improbable. The only means of settling this question definitely is, to subject the oil and its compounds to rigid ultimate analysis, which the want of accurate instruments has caused the author to defer to a future period.—*American Journal of Pharmacy*.

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#### ART. VII.—*Tracing Paper*.

IN order to prepare a beautiful, transparent, colourless paper, it is best to employ the varnish formed with Damara resin in the following way:—The sheets intended for this purpose are laid flat on each other, and the varnish spread over the uppermost sheet by means of a brush, until the paper appears perfectly

colourless, without, however, the liquid therein being visible. The first sheet is then removed, hung up for drying, and the second treated in the same way. After being dried this paper is capable of being written on, either with chalk and pencil or steel-pens. It preserves its colourless transparency without becoming yellow, as is frequently the case with that prepared in any other way: it is at the same time cheap, and the operation gives very little trouble.—*Verh. d. Gew. V. ru. Köln.*

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ART. VIII.—*Formic acid.*

NOELLE distilled 70 pounds of red-brown forest-ants, and obtained in the distilled liquor 11 drachms of a clear bright essential oil, which dissolved with difficulty in alcohol, whilst there floated on the remaining liquor 35 ounces of a fat yellow oil, resembling oil of eggs. The distilled liquor, and the residue, (both free from the oil), were mixed; and 1, according to Berzelius' process, treated with oxide of lead, and 1 with carbonate of lime, &c. They yielded 16 ounces of formic acid of sp. gr. 1.15, and 44 ounces of crystalline formate of soda. By employing the formate of lime for the purpose of preparing the concentrated acid, very spacious vessels should be used, because the consolidating liquor has the property of ascending on the sides thereof.—*Archiv. d. Pharm.*

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CHYMISTRY APPLIED TO MANUFACTURES.

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ART. IX.—*On the quick process of Manufacturing Vinegar, termed Schellessig fabrikation.*

ALTHOUGH the process of the Schützenbach method for transforming spirit into vinegar is well known, some points having a practical application of this method deserve a close examination, on account of their influence on the result of labour. Professor Dr. Knopp, of Giessen, has undertaken experiments on this subject, and the results of his labours having been condensed by the editors of *Archiv. der Pharmacie*: we extract the following particulars, on account of their practical importance.

Through the apparatus, in which the vinegar is prepared, a good deal of air is driven, in a somewhat similar manner as is the case with stoves for heating rooms, which practice, it is ascertained, has been carried to excess, it being impossible to introduce the exact quantity of air and no more (960 Hessian cubic feet = 15 cubic meters) for the aum [two runlets] of vinegar, containing 5½ real acid) into the apparatus, and which is necessary for transforming the alcohol, by oxidation, into vinegar. An excess of air has this disadvantage, that it acts positively



against the object in view, by absorbing heat, and carrying away the spirituous vapours. It is, therefore, of the utmost importance for the manufacturer to ascertain the amount of noxious influence, in order to lessen it.

Knopp undertook some experiments for this purpose, in a manufactory containing six converters. The diameter of the air-holes was 1.3 inches. The vinegar manufactured for common use contained from 3 to 4% of real acid. To give an idea to those unacquainted with this process, we extract the following description from Dr. Pereira's *Materia Medica*:—

“ This is effected, by causing a mixture of one part of alcohol at 80 per cent., four to six parts water,  $\frac{1}{1000}$  of ferment, honey, or extract of malt, to trickle down through a mass of beech shavings steeped in vinegar, and contained in a vessel called a Vinegar Generator (*Essigbilder*), or Graduation Vessel. It is an oaken tub, narrower at the bottom than at the top, furnished with a loose lid or cover, below which is a perforated shelf (colender or false bottom), having a number of small holes loosely filled with packthread about six inches long, and prevented from falling through by a knot at the upper end. The shelf is also perforated with four open glass tubes, as air vents, each having their ends projecting above and below the shelf. The tub, at its lower part, is pierced with a horizontal row of eight equidistant round holes, to admit atmospheric air. One inch above the bottom is a syphon-formed discharge pipe, whose upper curvature stands one inch below the level of the air-holes in the side of the tub. The body of the tub being filled with beech chips, the alcoholic liquor (first heated to between 75° F. and 83° F.) is placed on the shelf. It trickles slowly down through the holes by means of the packthreads, diffuses itself over the chips, slowly collects at the bottom of the tub, and then runs off by the syphon pipe. The air enters by the circumferential holes, circulates freely through the tub, and escapes by the glass tubes. As the oxygen is absorbed, the temperature of the liquid rises to 100 or 104° F. and remains stationary at that point while the action goes on favourably. The liquid requires to be passed three or four times through the cask before acetification is complete, which is in general effected in from twenty-four to thirty-six hours.”

A mixture of about eighty gallons of water, nine gallons of spirit of from 44 to 45% Tralles, and three gallons of vinegar, containing 3.5% of real acid, forming together ninety-two gallons, yield, on an average, an almost equal quantity of vinegar, from ninety to ninety-one gallons, of the above-stated strength.

It has been ascertained by experience, that it is profitable not completely to finish the process of acetification in the apparatus, but only to convert the greater part thereof, and to transform the remaining alcohol into vinegar, according to the formerly prac-

tised process, by keeping it in casks; because the last portions of alcohol resist oxidation by the action of the air for a considerably longer period than the first. The temperature of the place was  $26.2^{\circ}$  R. =  $96.5^{\circ}$  F. and the hot days of summer alone form an exception to the rule that the temperature must be increased by artificial means.

The first object was to ascertain the quantity of air which must necessarily pass through the cask, in order to convert a certain known quantity of the mixture into vinegar of a given strength.

This was ascertained in the following manner:—Considering that the formation of 100 pounds of hydrated acetic acid require a consumption of 53 pounds of oxygen, or 227 pounds of air, = 5591.6 Hessian cubic feet at  $0^{\circ}$  ( $=32^{\circ}$  F). and 760<sup>mm</sup> barometrical pressure, and that the oxygen of the air passing out can be no more than the residue of that air which passes through without being absorbed; that, therefore, the latter must be less than the oxygen contained in the atmosphere—the amount of air passed through the apparatus must be found out by comparing the quantity of acetic acid formed in the apparatus, with the proportion of oxygen and azote contained in the air which passes out; or, in other words, the quantity of the air which passes out is equivalent to those portions thereof which have been in efficient action, and to that quantity which has passed through without suffering any change, both taken together; the quantity of azote which has been efficiently acting follows from the quantity of alcohol converted into acetic acid: If  $\frac{1}{n}$  indicates the proportion of oxygen in the passed air,  $a$  the azote of those portions which have been employed for the formation of vinegar, and  $x$  the overplus of air, we have (the contents of oxygen in the atmospheric air, taken at 21.0% volume);  $0.21 n x = a + x$ , therefore

$$x = \frac{a}{0.21 n - 1}$$

And the whole quantity of the escaping air

$$= \frac{0.12 a n}{0.21 n - 1}$$

This quantity of air must therefore be fixed by previously ascertaining the quantity of hydrated acetic acid really produced, and by examining the escaping air.

The proof of the strength of the acid was obtained by means of pure calcareous spar, by which it was ascertained to possess a medium strength of 2.608 $\frac{1}{2}$ .

The vinegar, however, when passing out from the refining casks, always contains a certain quantity of unchanged alcohol. This can be obtained as a very concentrated spirit of wine, by

distilling the vinegar, previously neutralised with care, and contriving that the cooling tube shall be kept very cold, and strongly inclined towards the retort, when the most volatile vapours only pass into the receiver, the alcoholic strength of which is then easily ascertained by their specific gravity.

Thus examined, 100 parts of vinegar taken from the oxidating apparatus, and passed into the storing vats, contained—

|                      |      |
|----------------------|------|
| Hydrated acetic acid | 2.6  |
| Alcohol              | 1.0  |
| Water                | 96.4 |

A series of experiments on the air escaping from the converting casks at different periods, whilst the spirit underwent transformation, proves that its contents of oxygen fluctuate between 17 and 20; amounting, therefore, on an average, to 19.1% of the volume; so that, under the ordinary action and arrangement of the apparatus,  $\frac{1}{10}$  only of the oxygen passing through with the air is absorbed; that  $\frac{9}{10}$  therefore escape unchanged, and that the absorption of oxygen (the formation of vinegar) continues in almost uniform intensity, although the temperature in the apparatus is continually changing; and that the temperature, therefore, does not furnish any scale for ascertaining whether the process is proceeding satisfactorily.

The contents of oxygen in 100 volumes of escaping air are, then, on an average 19.1: the proportion of both is, therefore,

$$100 : 19.1 = \frac{19.1}{100} = \frac{1}{5.2356} = \frac{1}{n}$$

by expressing it in the general manner as above. The above-mentioned mixture furnishes 206.5 measures of vinegar, of 2.6% (= 824 pounds of vinegar) containing 21.4 pounds of hydrated acetic acid, the formation of which required 1311 cubic feet of atmospheric air, (at the temperature of 26° C. = 70° F. in the room), which yield 275 cubic feet of oxygen to the vinegar during the process, while 1036 cubic feet of azote (at 26° C.) escape through the upper openings of the cask. These two numbers of  $n = 5.2356$  and  $a = 1036$  give, as the quantity of air escaping to no purposes,

$$x = \frac{1036}{0.21 \times 5.2356 - 1} = 10415$$

cubic feet at 26° C.: (this gives for 1 pound of alcohol 647 cubic feet, and for 1 pound of hydrated acetic acid 487 cubic feet of air. By adding to the above 10415 cubic feet, 1036 cubic feet of azote, the quantity of air escaping during the oxydation is found: 11,451; and the whole amount of air passed into the apparatus, by adding to these 11,451 cubic feet, the above-calculated 245 cubic feet of oxygen consumed: 11,726 cubic feet, a very considerable quantity. According to the given diameters of

the air holes, this quantity answers to a rapidity of current equal to 1.3 inches per second, the time for the working being fixed at 48 hours. Since 55.3 cubic feet of air would be required according to theory for the formation of 1 pound of hydrated acetic acid, this, however, in reality requires a supply of 458 cubic feet, that is to say, ten times the quantity ; it follows, without further observation, that this surplus must have a very injurious influence on the process, both of absorbing heat and by carrying away alcoholic vapours. The amount of this influence can be calculated from the above data.

The mixture of 180 measures of water, 20 measures of spirit, (at the spec. grav. 0.943 = 35.5% by weight), and 6.5 measures of vinegar, of 3.5%, used in this process, consist, if we set aside the vinegar added, of—

|                 |            |   |                         |          |
|-----------------|------------|---|-------------------------|----------|
| Water - - - -   | 768.5 lbs. | { | Water - - - -           | 720 lbs. |
| Alcohol - - - - | 27         | { | or Spirit at 45 Tralles | 75.5     |
|                 | <hr/>      |   |                         | <hr/>    |
|                 | 795.5      |   |                         | 795.5    |

The quantity of vinegar really obtained from this mixture, (at 2.6% hydrated acetic acid, and 1% of alcohol), 206 measures, = about 91 gns. after deduction of the added vinegar :

|                      |           |   |                         |            |
|----------------------|-----------|---|-------------------------|------------|
| Water - - - -        | 769 lbs.* | { | Water - - - -           | 757.5 lbs. |
| Hydrated acetic acid | 21        | { | or Hydrated acetic acid | 21.0       |
| Alcohol - - - -      | 8         | { | Spirit at 55 Tralles    | 22.5       |
|                      | <hr/>     |   |                         | <hr/>      |
|                      | 798       |   |                         | 798        |

## PRACTICAL PHARMACY.

### ART. X.—*Prussic Acid.*

For preparing prussic acid, Dr. Winckler recommends us to put 120 grains of crystallized and finely-powdered pure yellow prussiate of potash into a tubulated retort, and to infuse it with a mixture of 240 grains of a solution of pure phosphoric acid of 1.25 specific gravity, and 480 grains of alcohol of 80 per cent., to close the whole perfectly, then to put into the receiver 120 grains of rectified spirit of wine, to agitate the retort for 24 hours, and to distil after that period, aided by a good apparatus for refrigeration, and to prevent loss by introducing a hermetically adapted glass tube into the main tube, one end of which leads to the bottom of a small glass vessel, rather high than wide, and containing 30 grains of spirit of wine, and to add to the distilled liquor sufficient alcohol to cause its weight to amount exactly to 1½ ounce. The contents of cyanogen, ascertained by nitrate of

\* The weights are given in German pounds ; but as it refers merely to proportions this is immaterial. 5524.8 grains Troy are equivalent to 1 pound German.

silver, yielded in 100 grains of the acid 9.027 grains of cyanide of silver = 11.9868 of cyanogen = 2.0621 of anhydrous prussic acid.—*Jahrbuch f. prakt. Pharm.*

ART. XI.—*Preparation of Flores Benzoes according to Gauger.*

GAUGER places 12 ounces of coarsely-powdered Benzoin resin, mixed with sand, in a flat iron vessel capable of containing from 2 to 4 pounds, which is heated by hot sand, covers the mouth of the vessel with loose blotting paper, places therein a stick, which supports 4 or 5 paper disks, at some distance above the blotting-paper, horizontally fixed on the stick; then tilts a paper bag in the form of a sugar-loaf, and formed of a double sheet of paper, (inwards blotting-paper, and outwards sugar-paper.) over it, and attaches this apparatus by means of a string around the brim of the vessel. After 6 or 8 hours it is allowed to cool, the benzoic acid taken out of the bag and from the paper discs, the paper attached over the mouth of the vessel renewed, the whole arrangement again put together, and then again heated for some hours to a higher temperature. It is advisable to renew the paper for the third time. The white crystals are immediately separated from the product, the coloured crystals strongly pressed between folds of blotting paper, and again sublimed as before. 12 ounces of good benzoin thus furnish from 10 to 11 drachms of fine benzoic acid. Some benzoic acid may afterwards be obtained from the papers employed.—*Gauger's Report.* 1842.

ART. XII.—*On Crystals found in the Extractum Helenii.*

By H. MULLER.

WHEN I discovered, a short time ago, in a vessel used for keeping *extractum helenii*, as also was lately noticed by Röttcher, some small white crystals in the shape of needles, and these both under the cover and on the sides of the vessel, I was induced to examine the statement of Röttcher, as to whether these crystals consisted of benzoic acid, since it is interesting to know whether benzoic acid occurs in such cases; no plant of the family *Compositæ*, the analysis of which has been made known, being supposed to contain this acid. The slight quantity of the substance admitted only of a few experiments. Some crystals were first brought on moist litmus paper without producing a red colour, whilst the slightest quantity of benzoic acid instantly produced this effect to a perceptible degree. A slight quantity was then heated in a test-tube, it sublimed easily, without, however, evolving the characteristic pungent smelling fumes of benzoic acid. The remains of this substance were treated with nitric acid in excess, the remaining liquor then neutralized with ammonia, and mixed with a solution of gypsum, indicated perceptible reaction with oxalic

acid. These experiments were, at all events, sufficient to prove that the crystals in question do not consist of benzoic acid. They possess, on the contrary, all the physical properties of helenin or Alantcomphor, which the experiments made with them likewise indicate.—*Arch. d. Ph.*

#### ART. XIII.—*Ferro-Sulphate of Potassa.*

ANTHON found that if two atoms (78 parts by weight), of oxide of iron, are combined with three atoms (147 parts by weight) of hydrated sulphuric acid, by intimately mixing, and, perhaps, slightly heating they are converted into one and a half atoms of persulphate of iron; or if the same end is endeavoured to be obtained by like treatment of the corresponding quantities of basic sulphate of oxide of iron, and of sulphuric acid, and the thus-formed one and a half atoms of sulphate of oxide of iron is then mixed with one atom (87.2 parts by weight) of sulphate of potassa, it will not occur, as might be supposed, that by evaporation and crystallising, that ferro sulphate of potassa (potassa alum) is obtained, but two different salts, one of which dissolves with difficulty, and is of a dark brown colour, yielding no distinct crystals, but only crystalline crusts; the other, the concentrated solution of which, when afterwards cooled, forms into large, distinct, colourless octahedra, perfectly resembling alum. which, however, are always partly covered by a mechanical adherence of some of the former brown salt, which dissolves with difficulty.

The former of these salts is, at least, partly decomposed, when redissolved in hot water, for while the solution assumes an intensely red colour, an insoluble basic combination being, at the same time, formed of a pale-yellow or yellowish-white colour. This consists in 100 parts of—

|                               |      |
|-------------------------------|------|
| Peroxide of iron . . . . .    | 41.4 |
| Sulphuric acid. . . . .       | 35.6 |
| Water . . . . .               | 15.0 |
| Sulphate of potassa . . . . . | 8.0  |

If the clear dark-red brown liquid, after being separated from the precipitated insoluble combination, is put aside for crystallizing, the above described dark-brown, and almost insoluble salt, re-appears, and the remaining mother-liquor changes its colour into a pale greenish-brown; and if again concentrated, yields anew a quantity of colourless crystals, which have not at present been closely examined.

The insoluble brown salt loses, if heated (but not to red heat), 15.4 of water, and assumes a dark-brown, and afterwards reddish-brown, colour; and if further heated to a glowing white, it is fused, losing at the same time 25.3 of sulphuric acid.

The almost insoluble yellow-brown salt consists, in 100 parts, of—

|                            |                                 |
|----------------------------|---------------------------------|
| Peroxide of iron . . . . . | 21.2                            |
| Sulphuric acid . . . . .   | 25.3                            |
| Potassa . . . . .          | } simple sulph. of potassa 37.8 |
| Sulphuric acid . . . . .   |                                 |
| Water . . . . .            | 14.4                            |
| Loss : . . . . .           | 0.3                             |
|                            | <hr/> 100.0                     |

the stoichiometrical composition is, therefore,—

|                                              |       |
|----------------------------------------------|-------|
| 5 atoms of oxide of iron . . . . .           | 195.0 |
| 6   "   sulphuric acid . . . . .             | 240.0 |
| 4   "   simple sulphate of potassa . . . . . | 348.8 |
| 16   "   water . . . . .                     | 144.0 |

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927.8

The white octahedral salt which consolidates at the end of the process, melts in its own water of crystallization when heated in the platina crucible, gradually losing the same, and leaves behind a whitish yellow, spongy mass, like burnt alum. The quantity of expelled water which escapes before the salt arrives nearly at the same point of red heat, during which no further loss in weight takes place, amounts to 48.5%. The remaining spongy residue, again exposed to a violent red-heat until no further loss of weight takes place, is somewhat diminished in volume, and there occurs a loss 24.4% of sulphuric acid, when a residue of 42.1% of a red-brown colour, and consisting of 15.1% of oxide of iron and 17% of sulphate of potassa, is left behind.

The octahedral colourless salt consists, then, in 100 parts, of—

|                          |                                               |      |
|--------------------------|-----------------------------------------------|------|
| Oxide of iron . . . . .  | } one and a half phosphate of oxide of iron { | 15.1 |
| Sulphuric acid . . . . . |                                               | 24.4 |
| Potassa . . . . .        | } simple sulphate of potassa . . . . .        | 17.0 |
| Sulphuric acid . . . . . |                                               |      |

---

100.0

The stoichiometrical composition is—

|                                    |       |
|------------------------------------|-------|
| 2 atoms of oxide of iron . . . . . | 78.0  |
| 3   "   sulphuric acid . . . . .   | 120.0 |
| 1   "   potassa . . . . .          | 47.2  |
| 1   "   sulphuric acid . . . . .   | 40.0  |
| 24   "   water . . . . .           | 216.0 |

like iron-alum already known.

The nearly insoluble brown salt may be dissolved in 12.5 parts of water: the white octahedral salt, on the contrary, is soluble in 5 parts of water.—*Arch. d. Ph.*, Nov. 24.

## COLOURED FIRES.

*To the Editors of the Annals of Chymistry and Pharmacy.*

GENTLEMEN,—Being a subscriber to your Magazine, and seeing forms for various coloured fires, which I think of no use, as I have tried the Carbon Ligni, and never found it answer, I enclose a few recipes for fires, which I know are perfect; for I prepare and sell a great quantity.

I remain, Gentlemen, your obedient servant,  
A RETAIL CHEMIST AND DRUGGIST.  
Birmingham,  
Jan. 23, 1843.

WHITE FIRE.—Nitre,  $\text{ʒj}$ . and  $\text{ʒij}$ .; Sulphur,  $\text{ʒijj}$ . and  $\text{ʒj}$ .; Ant. Sulph. Nigri,  $\text{ʒj}$ . and  $\text{ʒij}$ .

RED FIRE.—Burnt Nitrate of Stronten,  $3\frac{1}{2}$  oz.; Flowers of Sulphur, 13 drachms; Chlorate of Potass, 5 drachms; Ant. Sulph. Nigri, 4 drachms; Lamp Black, 56 grs.: if wanted to burn quicker, add more Chlorate of Potass.

GREEN FIRE.—Nitrate of Barytes,  $10\frac{1}{2}$  drachms; Sulphur Flowers, 2 drachms; Pot. Chloride, 162 grs.; Lamp Black, 26 grs.

PURPLE OR BLUE FIRE.—Oxymur Potass,  $\text{ʒix}$ .; Distilled Verdigris,  $\text{ʒij}$ .; Sulphur,  $\text{ʒj}$ .

ANOTHER BLUE FIRE.—Pot. Oxy. 9 oz.; Sulphur, 12 oz.; Refiners' Blue Verditer, 3 oz.

YELLOW FIRE.—Nitre, 3 oz.; Meal Powder, 3 oz.; Flower of Sulphur, 3 oz.; Common Salt, well dried till quite brown, 2 oz.

ANOTHER YELLOW FIRE.—Nitrate of Soda, well dried, 6 oz.; Brimstone, 1 oz.; Lamp Black, 1 oz.

## PHARMACEUTICAL SOCIETY.

A MEETING of the Pharmaceutical Society took place on Wednesday evening: Mr. Gifford in the Chair. A lecture on the various tests to be applied to certain chemicals sold by druggists was delivered by Mr. Fownes. The lecturer first touched on the importance of uniformity in a medical point of view; and, secondarily, the annoyance felt by the purchaser of an inferior article in a commercial point of view. Having enumerated various tests for sulphuric acid—

1st. By dilution, to ascertain the quantity of sulphate of lead contained therein.

2dly. By evaporation, to ascertain the quantity of saline impurity.

3dly. By passing a quantity of sulphuretted hydrogen to detect arsenic—the lecturer proceeded to describe the value, and gave a formula for ascertaining the quantity of real acid contained in oil of vitriol by means of the alkalimeter. Instructions were then given for preparing the test acid of the analytical chymist. Muriatic acid was next treated upon, whose impurities were deemed unworthy of lengthened comment. Nitric acid was in like manner very briefly treated. The strength of hydrocyanic acid next engaged the lecturer's attention. He recommended the precipitation of a cyanide by the addition of nitrate of silver, washing, drying, and weighing the precipitate, and gave a formula whereby from such ascertained weight the quantity of real acid contained therein might be ascertained.

|      |                    |                   |                       |                                     |
|------|--------------------|-------------------|-----------------------|-------------------------------------|
|      | Cyanide of silver. | Hydrocyanic acid. | Precipitated cyanide. | Hydrocyanic acid contained therein, |
| Thus | 138.5              | : 27.5            | :: V                  | : X                                 |

Or still more briefly by dividing the precipitate by 5; since this latter involves an error scarcely appreciable.

We would here suggest a very important omission. The lecturer omitted to state, that muriatic acid is very frequently added to hydrocyanic acid, in order to preserve it—a practice recommended by Mr. John Barry, of Plough Court, and first made known, we believe, by Mr. Everett. Now in this case it is manifest the test proposed above is precisely that which would mislead the druggist. His precipitate consisting of chloride and cyanide, he would collect them indiscriminately, and founding his calculation on the weight of the two, would, in all probability, estimate the strength of his acid at double its real contents of cyanogen, arising from no means having been pointed out by the lecturer to detect and estimate the foreign ingredient. As the lecturer appeared fully aware of the transient impression of a lecture, and proposes publishing his address in the Society's Transactions, we trust he will not omit to remedy the oversight to which we have drawn his attention.



| NOMINA.                               | FORMULÆ.                                                                                         |
|---------------------------------------|--------------------------------------------------------------------------------------------------|
| <i>Chloras</i> Platinicus . . . . .   | $\text{Pt } \overset{\cdot\cdot}{\underset{\cdot\cdot}{\text{Cl}}}_2$ . . . . .                  |
| — . . . . .                           | $\frac{1}{2}$ . . . . .                                                                          |
| — Platinosus . . . . .                | $\text{Pt } \overset{\cdot\cdot}{\underset{\cdot\cdot}{\text{Cl}}}_2$ . . . . .                  |
| — Plumbicus . . . . .                 | $\text{Pb } \overset{\cdot\cdot}{\underset{\cdot\cdot}{\text{Cl}}}_2$ . . . . .                  |
| — Rhodicus . . . . .                  | $\text{R}_2 \overset{\cdot\cdot}{\underset{\cdot\cdot}{\text{Cl}}}_3$ . . . . .                  |
| — . . . . .                           | $\frac{1}{2}$ . . . . .                                                                          |
| — Stannicus . . . . .                 | $\text{Sn } \overset{\cdot\cdot}{\underset{\cdot\cdot}{\text{Cl}}}_2$ . . . . .                  |
| — . . . . .                           | $\frac{1}{2}$ . . . . .                                                                          |
| — Stannosus . . . . .                 | $\text{Sn } \overset{\cdot\cdot}{\underset{\cdot\cdot}{\text{Cl}}}_2$ . . . . .                  |
| — Stibicus . . . . .                  | $\text{Sb}_2 \overset{\cdot\cdot}{\underset{\cdot\cdot}{\text{Cl}}}_3$ . . . . .                 |
| — . . . . .                           | $\frac{1}{2}$ . . . . .                                                                          |
| — Stronticus . . . . .                | $\text{Sr } \overset{\cdot\cdot}{\underset{\cdot\cdot}{\text{Cl}}}_2$ . . . . .                  |
| — Telluricus . . . . .                | $\text{Te } \overset{\cdot\cdot}{\underset{\cdot\cdot}{\text{Cl}}}_2$ . . . . .                  |
| — . . . . .                           | $\frac{1}{2}$ . . . . .                                                                          |
| — Thoricus . . . . .                  | $\text{Th } \overset{\cdot\cdot}{\underset{\cdot\cdot}{\text{Cl}}}_4$ . . . . .                  |
| — Uranicus . . . . .                  | $\text{U}_2 \overset{\cdot\cdot}{\underset{\cdot\cdot}{\text{Cl}}}_3$ . . . . .                  |
| — . . . . .                           | $\frac{1}{2}$ . . . . .                                                                          |
| — Uranosus . . . . .                  | $\text{U } \overset{\cdot\cdot}{\underset{\cdot\cdot}{\text{Cl}}}_2$ . . . . .                   |
| — Vanadicus . . . . .                 | $\text{V } \overset{\cdot\cdot}{\underset{\cdot\cdot}{\text{Cl}}}_2$ . . . . .                   |
| — . . . . .                           | $\frac{1}{2}$ . . . . .                                                                          |
| — Yttricus . . . . .                  | $\text{Y } \overset{\cdot\cdot}{\underset{\cdot\cdot}{\text{Cl}}}_3$ . . . . .                   |
| — Zincicus . . . . .                  | $\text{Zn } \overset{\cdot\cdot}{\underset{\cdot\cdot}{\text{Cl}}}_2$ . . . . .                  |
| — Zirconicus . . . . .                | $\text{Zr}^2 \overset{\cdot\cdot}{\underset{\cdot\cdot}{\text{Cl}}}_3$ . . . . .                 |
| — . . . . .                           | $\frac{1}{2}$ . . . . .                                                                          |
| <i>Chloretum</i> Aluminicum . . . . . | $\text{Al}_2 \overset{\cdot\cdot}{\underset{\cdot\cdot}{\text{Cl}}}_3$ . . . . .                 |
| — . . . . .                           | $\frac{1}{2}$ . . . . .                                                                          |
| — — cum aqua . . . . .                | $\text{Al}_2 \overset{\cdot\cdot}{\underset{\cdot\cdot}{\text{Cl}}}_3 + 12 \text{H}_2$ . . . . . |

| PONDERA ATOMORUM. |                    | PARTES CENTESIMALES. |       |                      |
|-------------------|--------------------|----------------------|-------|----------------------|
| O = 100           | H <sub>a</sub> = 1 | + E                  | — E   | H vel H <sub>a</sub> |
| 3318,80           | 265,94             | 43,19                | 56,81 |                      |
| 1659,40           | 132,97             |                      |       |                      |
| 2276,15           | 182,89             | 58,59                | 41,41 |                      |
| 2287,15           | 187,29             | 59,67                | 40,33 |                      |
| 4480,73           | 355,04             | 36,17                | 63,83 |                      |
| 1476,91           | 118,35             |                      |       |                      |
| 2820,60           | 226,02             | 33,16                | 66,84 |                      |
| 1410,80           | 113,01             |                      |       |                      |
| 1777,95           | 142,47             | 46,99                | 53,02 |                      |
| 4740,86           | 379,89             | 40,35                | 59,65 |                      |
| 1580,29           | 126,63             |                      |       |                      |
| 1589,94           | 127,40             | 40,71                | 59,29 |                      |
| 2887,07           | 231,34             | 34,70                | 65,30 |                      |
| 1443,53           | 115,67             |                      |       |                      |
| 1787,55           | 143,24             | 47,27                | 52,73 |                      |
| 8550,67           | 685,17             | 66,93                | 33,07 |                      |
| 2850,22           | 228,39             |                      |       |                      |
| 3754,01           | 301,51             | 74,89                | 25,11 |                      |
| 2942,20           | 235,76             | 35,92                | 64,08 |                      |
| 1471,10           | 117,88             |                      |       |                      |
| 1445,17           | 115,80             | 34,77                | 65,23 |                      |
| 1445,88           | 115,86             | 34,80                | 65,20 |                      |
| 3968,36           | 317,99             | 28,74                | 71,76 |                      |
| 1322,79           | 106,00             |                      |       |                      |
| 1670,29           | 133,84             | 20,50                | 79,50 |                      |
| 556,76            | 44,61              |                      |       |                      |
| 3020,04           | 242,00             | 11,33                | 43,97 | 44,70                |

| NOMINA.                            | FORMULÆ.                              |
|------------------------------------|---------------------------------------|
| <i>Chloretum</i> Ammonicum . . . . | $N_3 H_3 Cl_3$ . . . .                |
| — Argenticum . . . .               | $Ag Cl_3$ . . . .                     |
| — Auricum . . . .                  | $Au_3 Cl_3$ . . . .                   |
|                                    | $\frac{1}{3}$ . . . .                 |
| — Aurosum . . . .                  | $Au_3 Cl_3$ . . . .                   |
| — Baryticum . . . .                | $Ba Cl_3$ . . . .                     |
| — — c. a. . . .                    | $Ba Cl_3 + 2 \dot{H}_2$ . .           |
| — Benzoylicum . . . .              | $\ddot{B}z Cl_3$ . . . .              |
| — Bismuthicum . . . .              | $Bi Cl_3$ . . . .                     |
| — Cadmicum . . . .                 | $Cd Cl_3$ . . . .                     |
| — Calicum . . . .                  | $Ca Cl_3$ . . . .                     |
| — Calicum cum aqua .               | $Ca Cl_3 + 6 \dot{H}_2$ . .           |
| — — tri basic. c. a.               | $Ca Cl_3 + 3 \dot{Ca} + 15 \dot{H}_2$ |
| — Carbonicum . . . .               | $C Cl_3$ . . . .                      |
| — bi Carbonicum . . .              | $C_3 Cl_3$ . . . .                    |
| — Cericum . . . .                  | $Ce_3 Cl_3$ . . . .                   |
|                                    | $\frac{1}{3}$ . . . .                 |
| — Cerosum . . . .                  | $Ce Cl_3$ . . . .                     |
| — Chromicum . . . .                | $Cr_3 Cl_3$ . . . .                   |
|                                    | $\frac{1}{3}$ . . . .                 |
| — hyper Chromicum . .              | $Cr Cl_3$ . . . .                     |
|                                    | $\frac{1}{3}$ . . . .                 |
| — Cobalticum . . . .               | $Co Cl_3$ . . . .                     |
| — Cupricum . . . .                 | $Cu Cl_3$ . . . .                     |
| — Cupricum tri basicum .           | $Cu Cl_3 + 3 \dot{Cu}$ . .            |

| PONDERA ATOMORUM. |                    | PARTES CENTESIMALES. |                 |                      |
|-------------------|--------------------|----------------------|-----------------|----------------------|
| O = 100           | H <sub>2</sub> = 1 | + E                  | — E             | H vel H <sub>2</sub> |
| 669,61            | 53,66              | 33,89                | 66,11           |                      |
| 1794,26           | 143,78             | 75,33                | 24,67           |                      |
| 3813,98           | 305,62             | 65,18                | 34,82           |                      |
| 1271,33           | 101,87             |                      |                 |                      |
| 2928,68           | 234,68             | 84,89                | 15,11           |                      |
| 1299,53           | 104,13             | 65,94                | 34,06           |                      |
| 1524,49           | 122,17             | 56,21                | 29,04           | 14,75                |
| 1775,17           | 142,25             | 75,06                | 24,94           |                      |
| 1329,57           | 106,54             | 66,71                | 33,29           |                      |
| 1139,42           | 91,30              | 61,15                | 38,85           |                      |
| 698,67            | 55,98              | 36,64                | 63,36           |                      |
| 1373,55           | 110,07             | 18,64                | 32,23           | 49,13                |
|                   |                    | Ca=30,92             | Cl              |                      |
| 3453,92           | 276,77             | Ca= 7,41             | 12,82           | 48,85                |
| 519,09            | 41,60              | 14,73                | 85,27           |                      |
| 598,53            | 47,72              | 25,67                | 74,33           |                      |
| 2477,85           | 198,51             | 46,40                | 53,60           |                      |
| 825,78            | 66,17              |                      |                 |                      |
| 1017,35           | 81,52              | 56,49                | 43,51           |                      |
| 2031,59           | 162,79             | 34,63                | 65,37           |                      |
| 677,20            | 54,26              |                      |                 |                      |
| 1237,12           | 99,13              | 28,44                | 71,56           |                      |
| 618,56            | 49,57              |                      |                 |                      |
| 811,64            | 65,04              | 45,46                | 54,54           |                      |
| 838,35            | 67,18              | 47,20                | 52,80           |                      |
|                   |                    | Cu                   | Cl <sub>2</sub> | Cu                   |
| 2325,43           | 186,34             | 17,02                | 19,03           | 63,95                |

ART. XVII.—*Bismuthum Nitricum Præcipitatum vel Bismuthi Trisnitræ.*

GEISELER ascertained by comparative experiment that the product is greater, if, according to Duflos, the nitrate of bismuth is allowed to crystallize previously to dilution with water, than if the dilution be executed at once. The proportion of the proceeds was =  $10\frac{1}{2} : 14$ , the quality of both preparations being alike.—*Ph. C. Bl.*, Dec. 1842.

## NOTICE TO SUBSCRIBERS.

The Editors of the ANNALS OF CHYMISTRY have to inform their readers that the present number completes the First Volume of the work, and that for the future it will be published monthly.

The chief causes which have induced this change, are,

1st. That it has been represented by those on whose experience in medical literature the proprietors fully rely, that it is too early to anticipate a large circulation for a weekly journal exclusively devoted to Chymistry and Pharmacy.

2nd. That, although it were easy to fill a weekly journal with extracts from foreign works, yet a monthly one, containing a brief compendium of all that is most interesting in Chymistry and Pharmacy, would be more acceptable to the majority of those interested in these sciences.

Among the characteristics of the ANNALS OF CHYMISTRY AND PHARMACY may be numbered the correspondence which has been organised with some of the most distinguished Chymists of the continent, which will be extended in the course of the spring.

For a specimen of the illustrations with which the Journal will continue to be embellished, the proprietors refer to the numbers which have already appeared, as well as to the steel engraving about to appear in the first monthly part of the ensuing volume.

The first monthly number of the ANNALS OF CHYMISTRY AND PRACTICAL PHARMACY, containing a Steel Engraving of the Laboratory at Giessen, will be published on the 28th February, price One Shilling, and will be continued on the last day of every succeeding month.

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